Service Manual

W475N, W485N, W4105N, W4130N, W4180N, W4250N, W4330N

Classic Control

438 9226-71/EN
07.04

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Safety

This machine can only be used with water.
Never use dry cleaning agents.

Do not allow children to operate the machine.

Do not hose down or spray the machine with water.

All mechanical and electrical installation must be carried out by qualified personnel.

Do not bypass the door locking device.

Should the machine malfunction, please report the fault to the technician responsible for the machine.

All external equipment which is connected to the machine must be CE/EMC-approved and connected using an approved shielded cable.

The manufacturer reserves the right to make changes to design and component specifications.

Technical data

	W475N	W485N	W4105N	W4130N	W4180N	W4250N	W4330N
Innerdrum							
volume litres	75	85	105	130	180	250	330
diameter mm	520	520	595	595	650	725	795
Drum speed							
wash	52	52	49	49	44	44	42
extraction rpm	528	528	494	494	471	446	427
Heating							
electricity kW	2.0/3.0/ 5.4/5.6/7.5	2.0/3.0/5.6 5.4/7.5	3.0/6.5/ 7.5/10	3.0/6.5 7.5/10	4.8/9.3 13	10.7/18	11/23
steam	x	x	x	x	x	x	x
hot water	x	x	x	x	x	x	x
G-factor	81	81	81	81	81	81	81
Weight, net kg	130	136	160	175	228	287	330

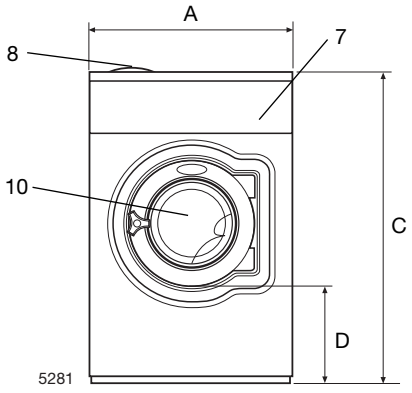
Connections

	W475N	W485N	W4105N	W4130N	W4180N	W4250N	W4330N
Water valves connection BSP	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"
Rec. water pressure kPa	200-600	200-600	200-600	200-600	200-600	200-600	200-600
Functioning limits for water valve kPa	50-1000	50-1000	50-1000	50-1000	50-1000	50-1000	50-1000
Capacity at 300 kPa l/min	20	20	20	20	60	60	60
Drain valve outer Ø mm	75	75	75	75	75	75	75
Draining capacity l/min	170	170	170	170	170	170	170
Steam valve connection BSP	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"
Rec. steam pressure kPa	300-600	300-600	300-600	300-600	300-600	300-600	300-600
Functioning limits for steam valve kPa	50-800	50-800	50-800	50-800	50-800	50-800	50-800

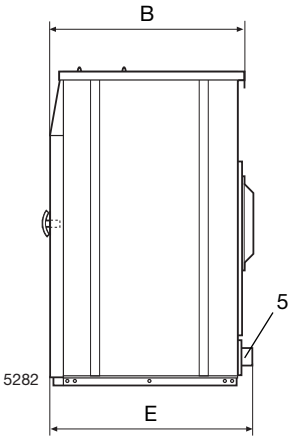
Technical data

1	Electrical connection
2	Cold water
3	Hot water
4	Steam connection
5	Drain
6	Liquid detergent supply
7	Control panel
8	Soap box
9	Water reuse
10	Door opening, W475N, W485N: ø310, W4105N: ø365, W4130N: ø395, W4180N, W4250N, W4330N: ø435

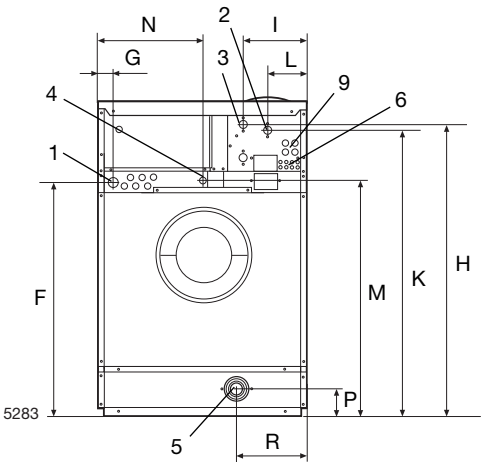
	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R
W475N	660	690	1115	355	725	825	45	1030	215	1010	130	830	385	-	100	210
W485N	660	730	1115	355	765	825	45	1030	215	1010	130	830	385	-	100	210
W4105N	720	705	1200	365	740	910	45	1115	215	1095	130	910	420	-	100	235
W4130N	720	790	1200	365	825	910	45	1115	215	1095	130	910	420	-	100	235
W4180N	750	880	1325	435	915	1035	45	1245	130	1225	210	1040	325	295	100	225
W4250N	830	955	1410	495	990	1120	45	1330	160	1290	245	1125	325	325	100	265
W4330N	910	1040	1445	500	1075	1155	45	1365	160	1325	245	1155	280	325	100	210



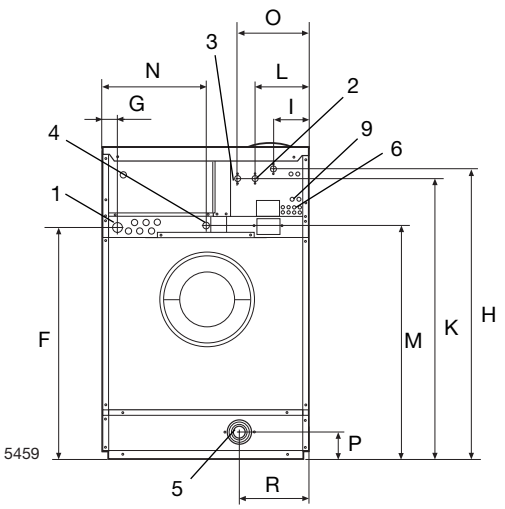
Front



Right side



Rear side **W475N-W4130N**



Rear side **W4180N-W4330N**

	W475N	W485N	W4105N	W4130N	W4180N	W4250N	W4330N
Frequency of the dynamic force Hz	9.3	9.3	8.7	8.7	7.9	8.3	7.5
Max floor load at extraction KN	1.1±2.8	1.2±3.1	1.4±3.5	1.7±4.1	2.8±5.3	2.2±4.7	3.8±6.0

W475N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating	190-200 V 3 AC	1.1	10
or Steam	230-240 V 1 AC	0.9	10
heating	200-240 V 3 AC	1.1	10
	240 V 3 AC	0.75	10
	380-415 V 3/3N AC	1.1	10
El heating	200 V 3 AC	5.5	20
	230 V 3 AC	3.0	10
	230 V 3 AC	5.3	16
	230 V 3 AC	7.2	25
	230-240 V 1 AC	5.5	25
	230-240 V 1 AC	7.5	35
	230-240 V 1 AC	2.0	16
	230-240 V 1 AC	2.9	16
	220-240 V 3 AC	3.0	10
	220-240 V 3 AC	5.3	16
	220-240 V 3 AC	7.2	25
	380-415 V 3/3N AC	3.1	10
	380-415 V 3/3N AC	5.3	10
	380-415 V 3/3N AC	7.2	16
	415 V 3/3N AC	3.3	10
	415 V 3/3N AC	5.7	10
	415 V 3/3N AC	7.8	16
	440/480 V 3 AC	7.8	16
	400/230 V 3/3N AC	7.2	16/25

W485N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating	120 V 1 AC	1.3	16
or Steam	190-200 V 3 AC	1.3	10
heating	208-240 V 1 AC	1.1	10
	200-240 V 3 AC	1.3	10
El heating	200 V 3 AC	5.5	20
	230-240 V 1 AC	2.2	16
	230-240 V 1 AC	3.2	16
	230-240 V 1 AC	5.5	35
	208-240 V 1 AC	6.9	35
	230-240 V 1 AC	7.5	35
	220-240 V 3 AC	3.1	10
	220-240 V 3 AC	5.3	16
	208-240 V 3 AC	6.9	25
	220-240 V 3 AC	7.2	25

W4105N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating or Steam heating	190-200 V 3 AC	1.5	10
	200-240 V 3 AC	1.6	10
	380-415 V 3/3N AC	1.6	10
	415 V 3N AC	1.6	10
	415-480 V 3 AC	1.6	10
	400-415 V 3/3N AC	1.6	10
El heating	200 V 3 AC	5.5	20
	200 V 3 AC	7.3	25
	230 V 3 AC	3.1	16
	230 V 3 AC	7.2	25
	220-240 V 3 AC	3.1	16
	220-240 V 3 AC	7.2	25
	220-240 V 3 AC	9.5	35
	380-415 V 3/3N AC	3.1	10
	380-415 V 3/3N AC	7.2	16
	380-415 V 3/3N AC	9.5	16
	415 V 3/3N AC	3.3	10
	415 V 3/3N AC	7.8	16
	415 V 3/3N AC	10.3	16
	440/480 V 3 AC	10.3	16
	400/230 V 3/3N AC	7.2	16/25
	400/230 V 3/3N AC	9.5	16/35

W4130N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating or Steam heating	190-200 V 3 AC	1.6	10
	208-240 V 1 AC	1.2	10
	200-240 V 3 AC	1.7	10
	230-240 V 1 AC	1.4	10
	380-415 V 3/3N AC	1.7	10
	415 V 3N AC	1.7	10
	400-415 V 3/3N AC	1.7	10
	415-480 V 3 AC	1.7	10
El heating	200 V 3 AC	5.6	20
	200 V 3 AC	7.3	25
	220-240 V 1 AC	3.1	16
	230-240 V 1 AC	3.2	16
	220-240 V 1 AC	7.2	35
	230-240 V 1 AC	7.5	35
	220-240 V 1 AC	9.5	50
	230-240 V 3 AC	9.9	50
	220-240 V 3 AC	3.2	16
	220-240 V 3 AC	7.3	25
	220-240 V 3 AC	9.6	35
	380-415 V 3/3N AC	3.2	10
	380-415 V 3/3N AC	7.3	16
	380-415 V 3/3N AC	9.6	16
	415 V 3/3N AC	10.4	16
	440/480 V 3 AC	10.4	16

W4180N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating or Steam heating	190-200 V 3 AC	2.1	10
	208-240 V 1 AC	2.3	16
	200-240 V 3 AC	2.1	10
	400-415/230 V 3/3N AC	2.1	10
	380-415 V 3/3N AC	2.1	10
	415 V 3N AC	2.1	10
	415-480 V 3 AC	2.1	10
El heating	200 V 3 AC	9.5	35
	220-240 V 1 AC	12.5	63
	230 V 3 AC	12.5	50
	220-240 V 3 AC	12.5	50
	380-415 V 3/3N AC	12.5	25
	415 V 3/3N AC	13.4	25
	440/480 V 3 AC	13.5	20
	400/230 V 3/3N AC	12.5	25/50

W4250N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating or Steam heating	190-200 V 3 AC	2.8	10
	208-240 V 1 AC	2.8	16
	200-240 V 3 AC	2.8	10
	380-415 V 3/3N AC	2.8	10
	415-480 V 3 AC	2.8	10
El heating	200 V 3 AC	13.2	50
	230 V 3 AC	17.2	50
	220-240 V 3 AC	17.2	50
	380-415 V 3/3N AC	17.2	35
	415 V 3/3N AC	18.6	35
	440 V 3 AC	18.7	35
	480 V 3 AC	18.7	25
	400/230 V 3/3N AC	17.2	35/50

W4330N

Heating alternative	Voltage alternative	Total kW	Fuse A
No heating	190-200 V 3 AC	1.7	10
or Steam	200-240 V 3 AC	1.9	10
heating	380-415 V 3/3N AC	1.7	10
	415-480 V 3 AC	1.9	10
El heating	200 V 3 AC	15.4	50
	220-230 V 3 AC	19.2	63
	230 V 3 AC	20	63
	240 V 3 AC	20.7	63
	380-400 V 3N AC	19.2	35
	415 V 3/3N AC	20.7	35
	440V 3 AC	21.9	35
	480 V 3 AC	23.7	35
	400/230 V 3/3N AC	20	35/63

Machine presentation

Description

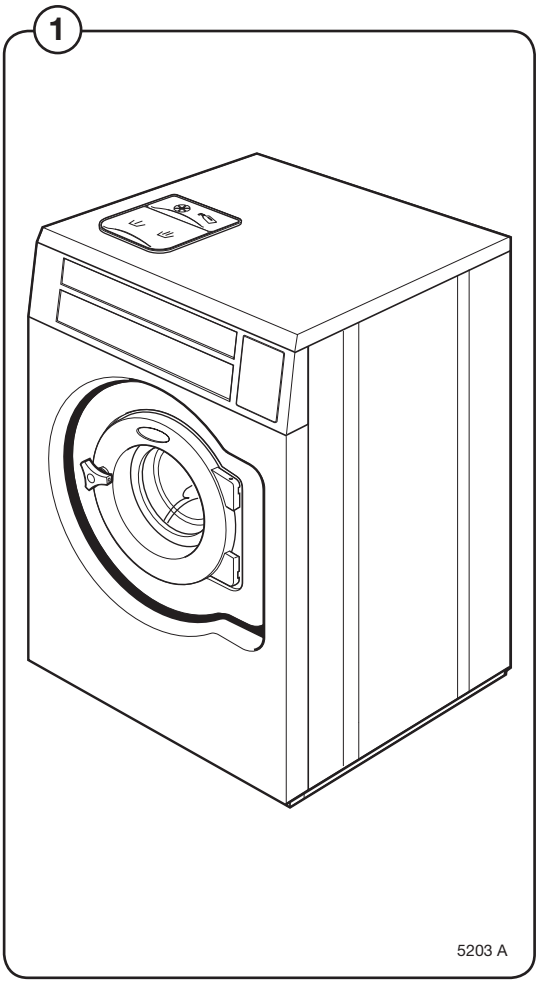
(1) The machines covered in this manual include the following models:

Drum volume (litres)	Model name
75	W475N
85	W485N
105	W4105N
130	W4130N
180	W4180N
250	W4250N
330	W4330N

The machines feature an electromechanical programme unit with fixed washing programmes.

The machines are supplied to customer specifications with e.g. electric or steam heating or no heating.

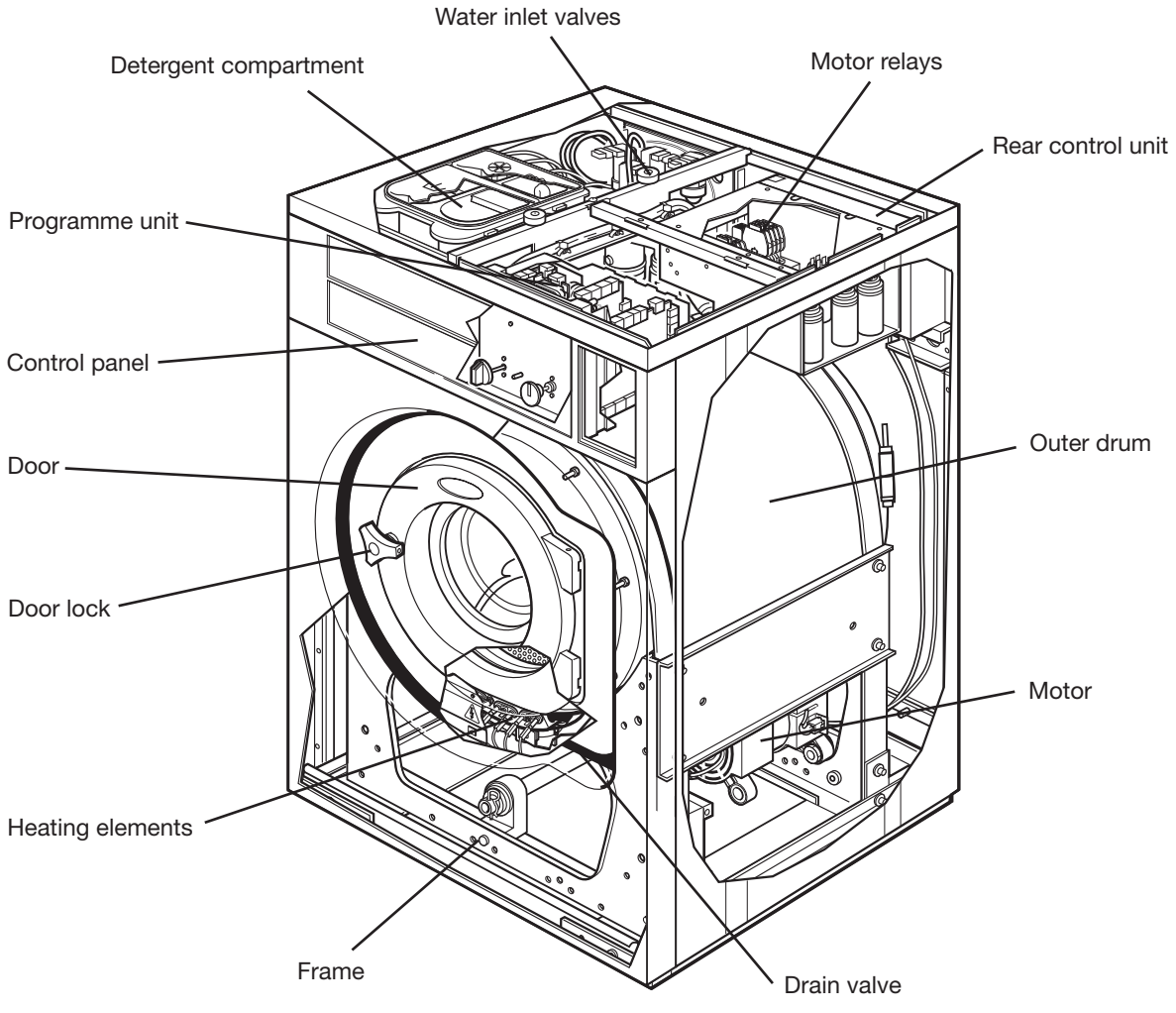
The machines are designed for installation in hotels, laundries (such as apartment buildings and coin laundries), factories, hospitals, various institutions, etc.



Function

(2) This section presents a general overview of the functions of the machine. Most functions are then presented in detailed in separate chapters in this service manual.

(2)



Programme unit

(3) The control panel has a rotary switch for selection of fixed machine programmes and a combined start/pause button with rapid advance.

(4) The programme unit controls the water valves, drain valve and heating via the communication card in the rear control unit. This unit can also be connected to send control signals to external units for detergent pumps.

The programme unit of the machine is described in detail in section **Programme unit**.

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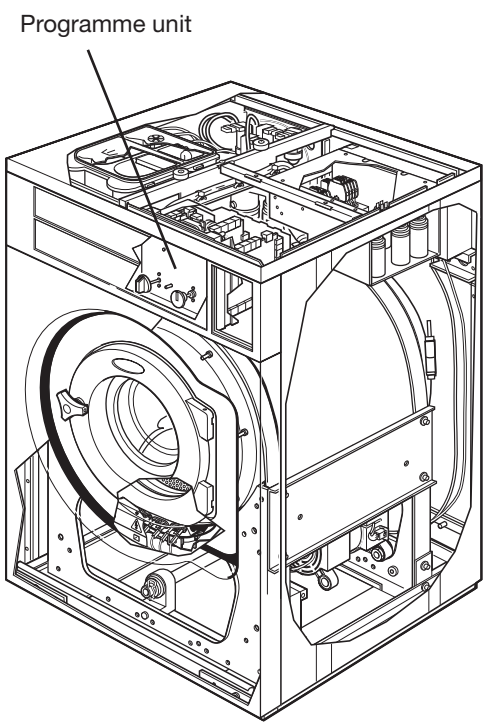

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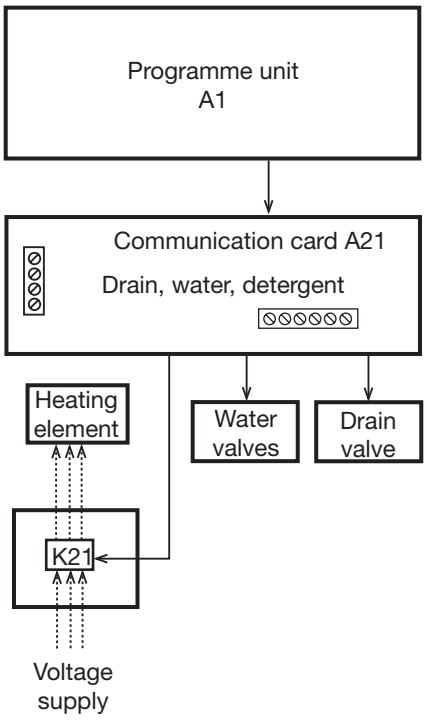

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Door lock

(5) The door lock is an electro-mechanical type with double safety switches. The lock is bi-stable, i.e., it needs to receive an active pulse from the control in order both to lock and unlock the door.

(6) A separate printed circuit board, called door lock control, can be fitted onto the programme unit. This board controls locking and unlocking. The card has separate checks for empty drum and stopped drum. Together with the checks built into the programme unit, this guarantees that the door cannot be opened by a mistake.

The door lock on the machine is described in detail in section **Door and door lock**.

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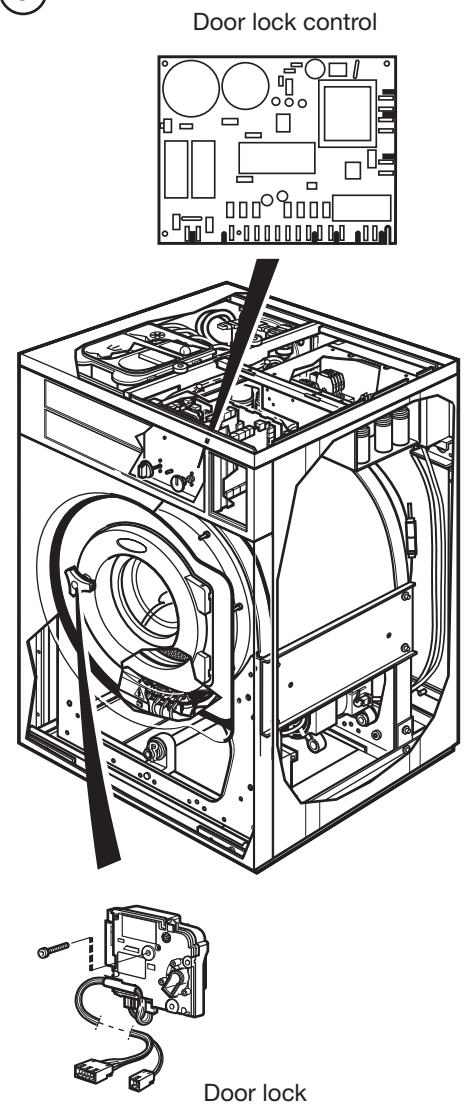

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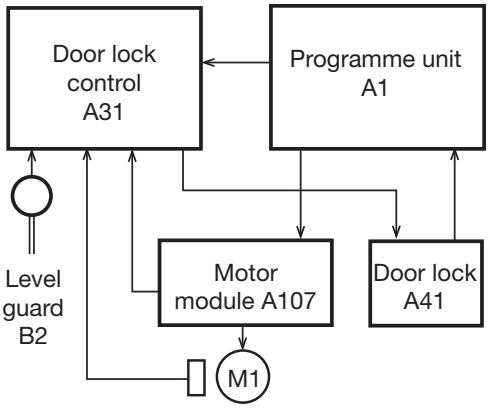

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Heating

(7) When using electric heating, the water for washing is heated by three heating elements accessible from the front of the machine.

The machine can also be fitted with steam heating using a steam valve fitted on the rear of the machine.

The heating system of the machine is described in detail in section **Heating**.

Water connections

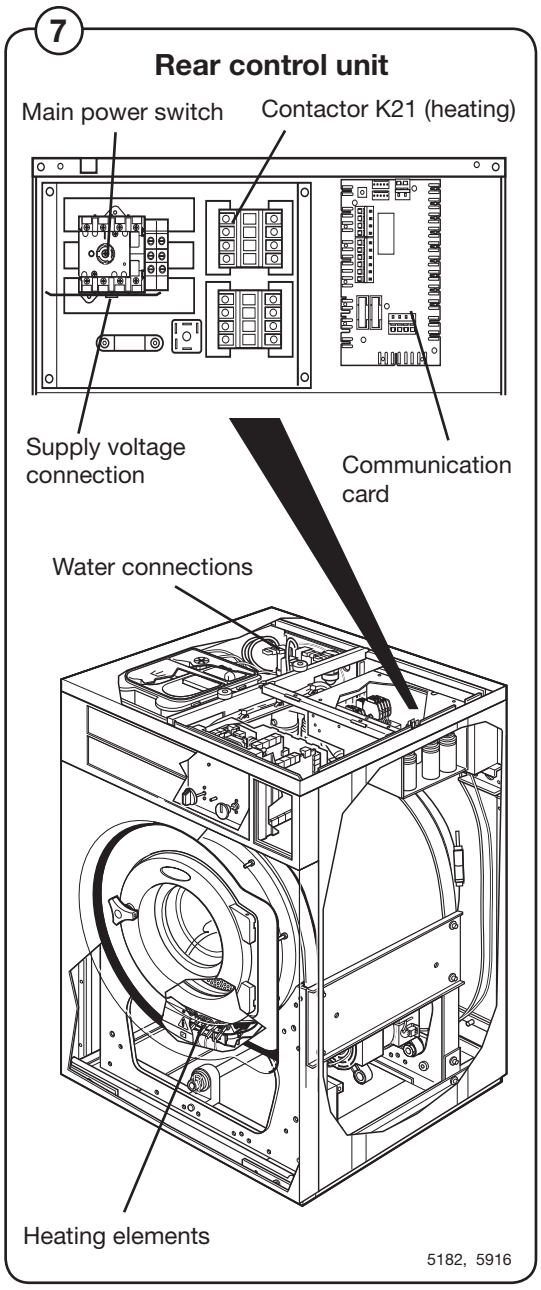
(7) Depending on the machine size and customer specifications, the machine has one, two, three or four inlet valves.

This unit also holds eight connectors for external detergent supply.

Rear control unit

(7) This box contains the main power switch or a connection block for the input voltage, heating contactor and a communication card with outputs that control the water and drain valves of the machine as well as the heating. There are also connection blocks for connection to e.g., an external detergent supply.

The rear electric box of the machines is described in detail in section **Control unit**.



Detergent compartment

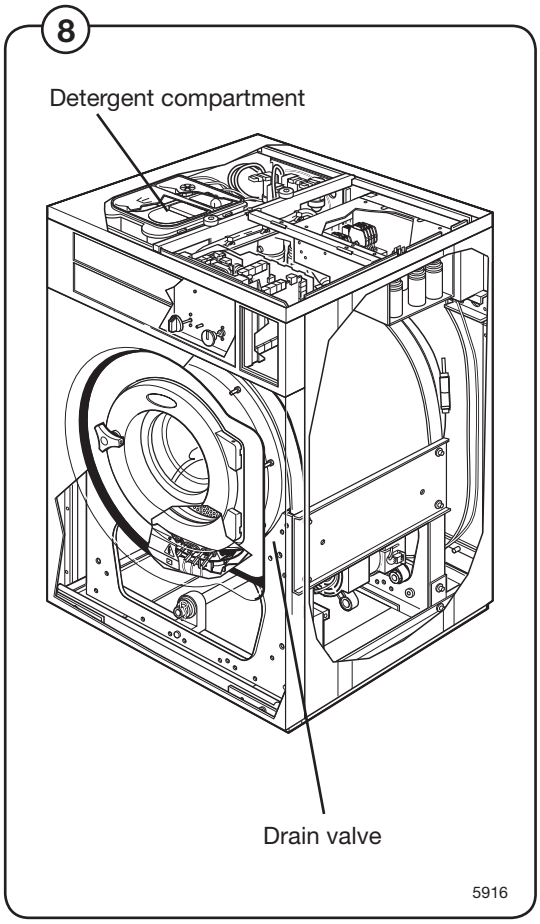
(8) The compartment is divided into four for pre-wash, main wash, rinse and bleaching-agent/liquid detergent.

The detergent compartment of the machine is described in detail in section **Detergent compartment**.

Drain valve

(8) This valve is a diaphragm valve that opens and closes by way of the water pressure. The control valve is situated next to the water valves.

The drain valve of the machine is described in detail in section **Drain valve**.

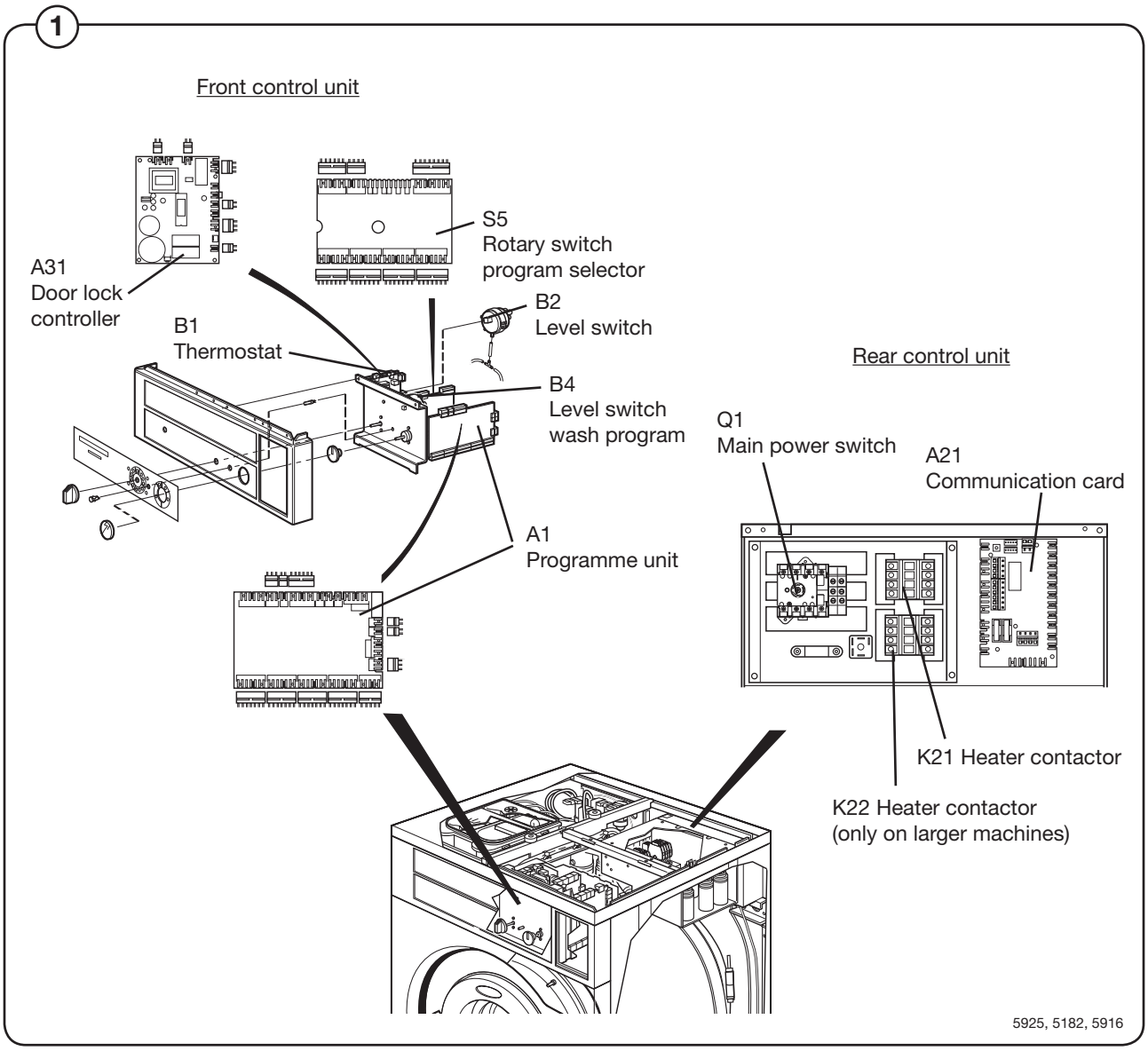


Control unit

Description

(1) The control unit of the machine consists of the following parts:

- **Front control unit**
  This unit contains an electro-mechanical programme unit A1, a safety control card for the door lock (door lock control A31), thermostat B1, level switch B2 and 4 and rotary switch S5.
- **Rear control unit**
  This module contains the main power switch Q1 with a connection for received voltage, the heat contactor K21 and the communication card A21 with outputs for e.g. external detergent supply.



Front control unit

Programme unit A1

(2) The programme unit is electromechanical and has up to 10 fixed programmes (depending on program).

The programme unit is described in detail in section **Programme unit**.

Level guard B2

(2) Control of the water level and turning of the drum are controlled with a backup guard, to ensure that the door will not open with water in the drum or when the drum rotates.

Apart from a level guard on the programme unit card, there is a level guard B2, connected to the door lock control A31. This card controls door locking action as well as the level and drum rpm speed.

Level guard B4

(2) Controls the water level for low and high level in wash programs.

Thermostat B1

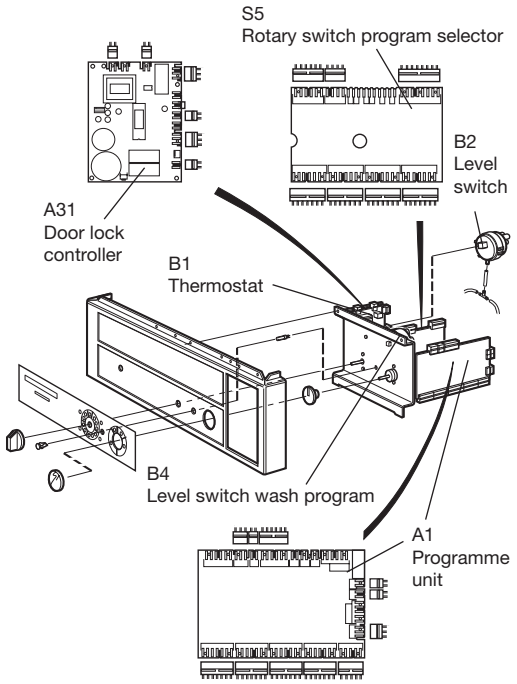
(2) Controls the wash temperature and closes the heating relay or steam valve when selected temperature is reached.

Rotary switch S5

Rotary switch for selecting wash program.

(2)

Front control unit



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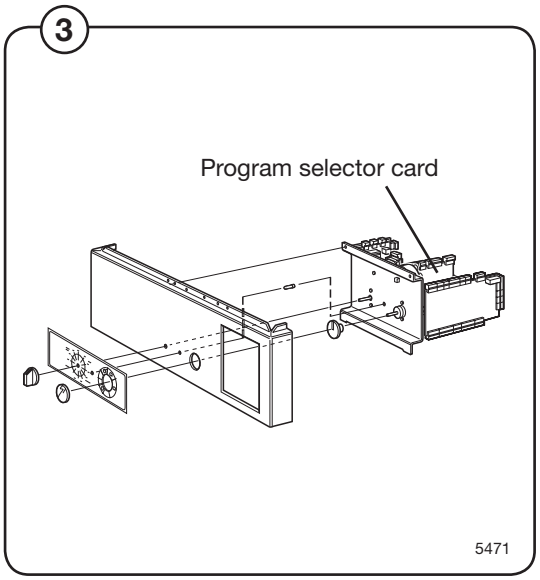
Jumpers on program selector card

(3) Jumpers are assembled on the program selector card. These jumpers can be moved or removed to obtain new functions for the wash programs.



Program OG01

(4) Jumper on A gives a correct function of valve Y25 (W4180-4330N). Y25 will flush in both pre wash and in main wash.

Jumper B gives a correct function of valve Y25 (W475-4130N). Y25 will flush only in pre wash and not main wash.

Jumper on C is bleaching function. It is recommended when compartment 4 is used for bleaching agent or if bleaching agent is supplied from a pump unit. There will be a flushing in compartment 4 during 30 seconds, 3.5 minutes after selected temperature is reached. Note! The pump signal, on connection X72:5 will appear 30 seconds before the flushing of compartment 4.

Jumper on D is main wash function. It is recommended when compartment 4 is used for main wash detergent or if main wash detergent is supplied from pump.

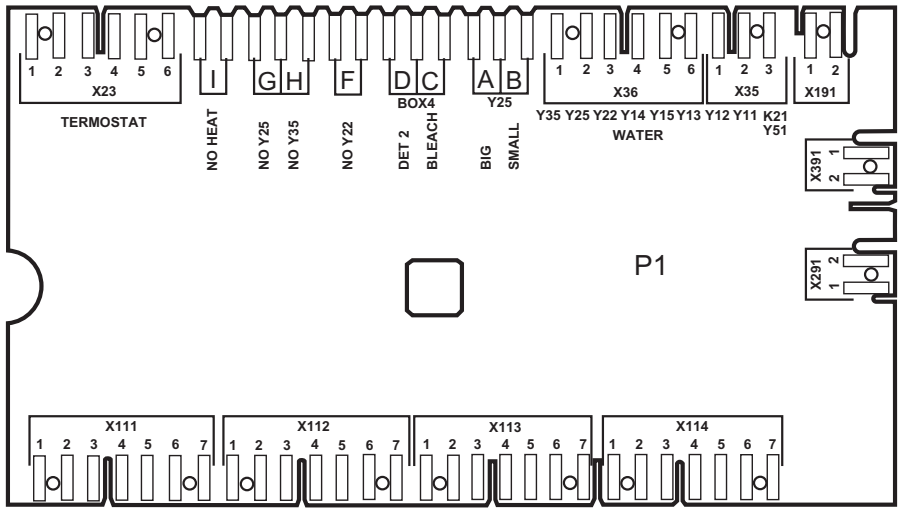
Jumper on F gives a correct function of valve Y12 (W4180-4330N). There are no Y22 valve on these machines.

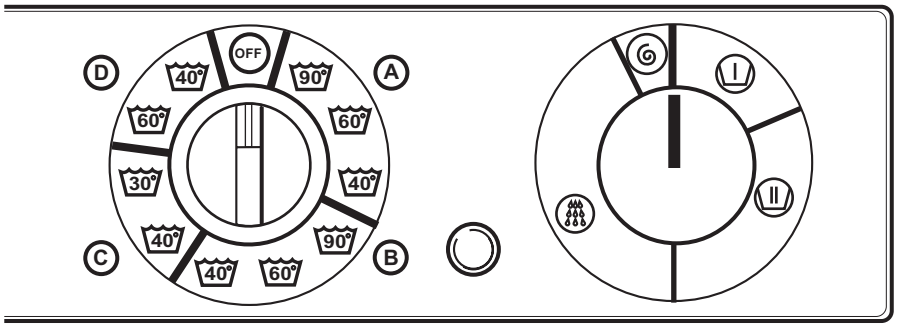
Jumper on G. (W4180-4330N with only cold water inlet). The signal for Y25 (hot inlet) will give cold inlet (Y15) instead.

Jumper on H for the machines (W4180-4330N without inlet valve Y35 will give cold inlet (Y15) instead and for the machines (W475-4130N without inlet valve Y35 will give cold inlet (Y11) in compartment 1 instead.

Jumper I (no heat). On machines without heating or machines with support heating. The wash program will not stop and wait for the selected temperature.

4





Program OG01

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Program OL02

(5) Jumper on A gives correct function of Y25 (W4180-4330N).
Y25 will flush in pre-wash and in main wash.

Jumper B gives correct function of Y25 (W475-4130N).
Y25 will flush in pre wash and not main wash.

Jumper on C is bleaching function. It is recommended when compartment 4 is used for bleaching agent or if bleaching agent is supplied from a pump unit. There will be a flushing in compartment 4 during 30 seconds, 3.5 minutes after selected temperature is reached. Note! The pump signal, on connection X72:5 will appear 30 seconds before the flushing of compartment 4.

Jumper on D is main wash function. It is recommended when compartment 4 is used for main wash detergent of if main wash detergent is supplied from pump.

Jumper on E gives a correct function of valve Y15 (cold water).
The valve Y15 will open in main wash (W4180-4330N).

Jumper on F gives a correct function of valve Y12 (W4180-4330N).
There are no Y22 valve on these machines.

Jumper on G. (W4180-4330N with only cold water inlet). The signal for Y25 (hot inlet) will give cold inlet (Y15) instead.

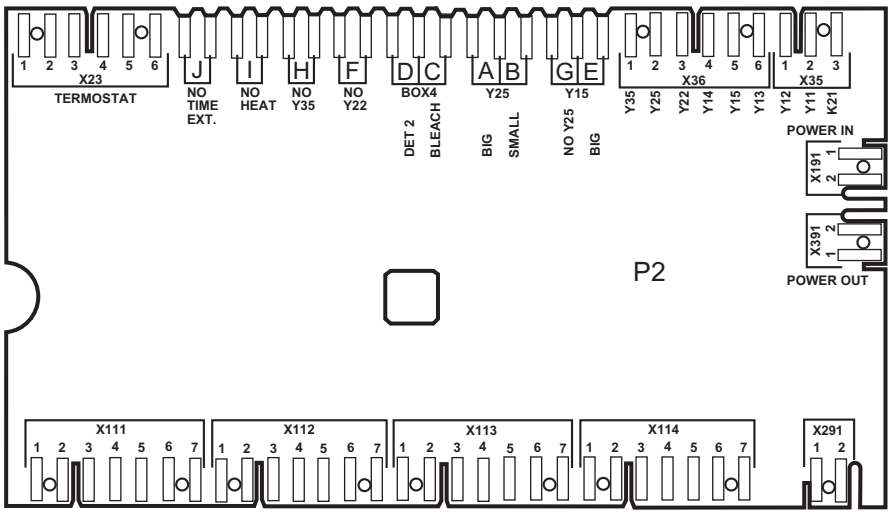
Jumper on H for the machines (W4180-4330N) without inlet valve Y35 will give cold inlet (Y15) instead and for the machines (W475- 4130N) without inlet valve Y35 will give cold inlet (Y11) in compartment 1 instead.

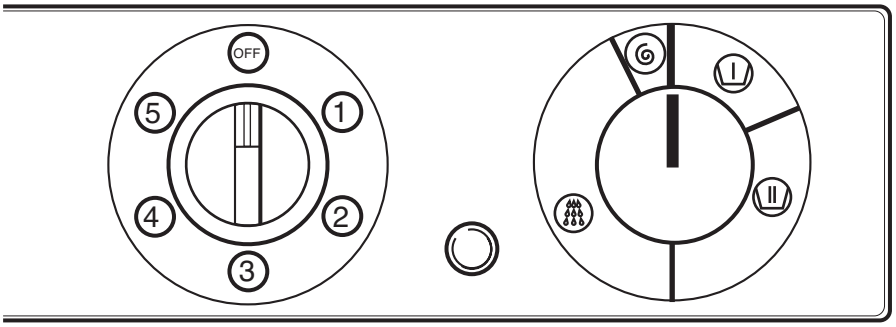
Jumper I (no heat). On machines without heating or machines with support heating. The wash program will not stop and wait for the selected temperature.

Jumper J (short program). If the jumper isn’t connected the agitation time in the wash program will be twice as long. Pre wash will be changed from 3 to 6 minutes, main wash from 6 to 12 minutes and rinsing time from 1 to 2 minutes.

Control unit

5





Program OL02

6054, 5478

Program OL03

⑥ Jumper on A gives correct function of Y25 (W4180-4330N).
Y25 will flush in pre-wash and in main wash.

Jumper B gives correct function of Y25 (W475-4130N).
Y25 will flush only in pre wash and not main wash.

Jumper on C is bleaching function. It is recommended when compartment 4 is used for bleaching agent or if bleaching agent is supplied from a pump unit. There will be a flushing in compartment 4 during 30 seconds, 3.5 minutes after selected temperature is reached. Note! The pump signal, on connection X72:5 will appear 30 seconds before the flushing of compartment 4.

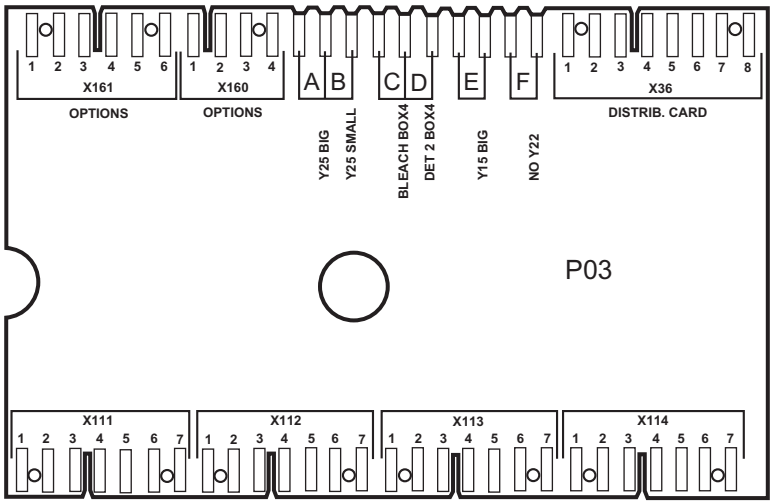
Jumper on D is main wash function. It is recommended when compartment 4 is used for main wash detergent of if main wash detergent is supplied from pump.

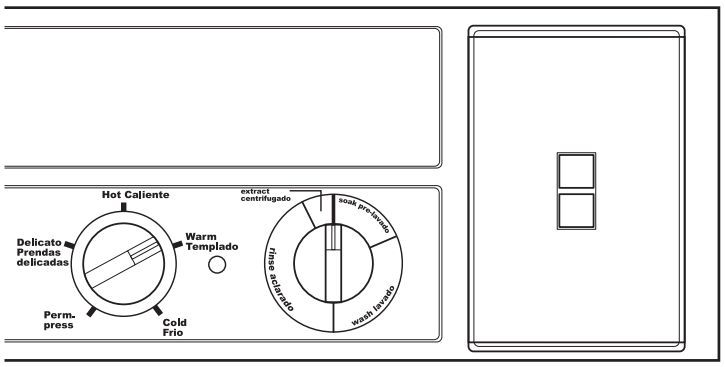
Jumper on E gives correct function of valve Y15 (cold water).
The valve Y15 will open in main wash (W4180-4330N).

Jumper on F gives a correct function of valve Y12 (W4180-4330N.
There are no Y22 valve on these machines.

Control unit

6





Program OL03

6055, 5475

Rear control unit

Main power switch Q1

(7) The main power switch interrupts all received power phases and is placed on the outside of the connection box cover.

The cover cannot be removed unless the main power switch is turned to the 0 position.

The received voltage supply is connected to the lower screw post of the main power switch, alt. the terminal connection.

Heating contactor K21

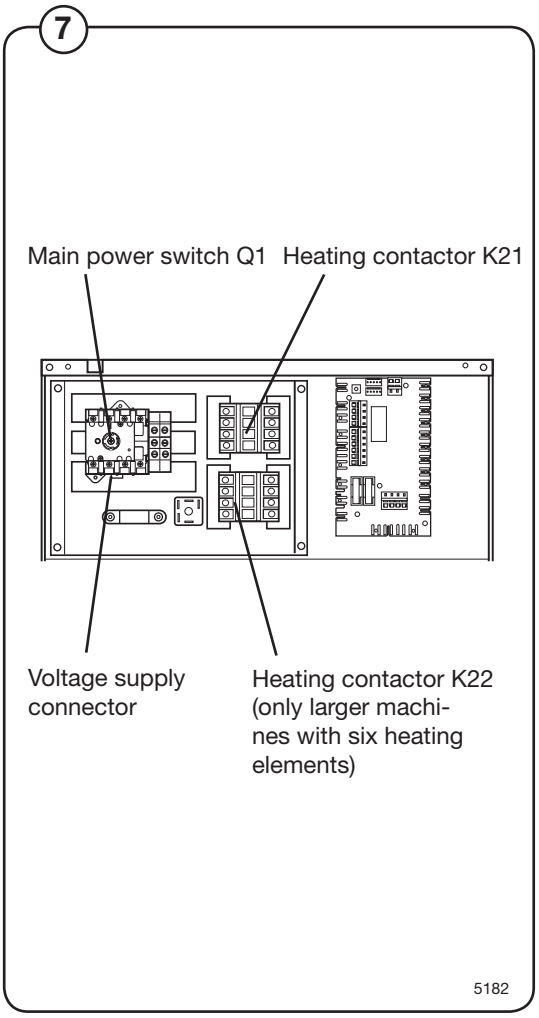
(7) This contactor is only featured on machines with electric heating.

It activates the three heating elements at the front, lower part of the outer drum. It is controlled by the programme unit A1 and thermostat B1.

Heating contactor K22

(7) This contactor is only featured on larger machines.

It activates the three heating elements, with a total of four circuits, situated at the front, lower part of the outer drum. It is controlled by the programme unit A1 and thermostat B1.



Communication card

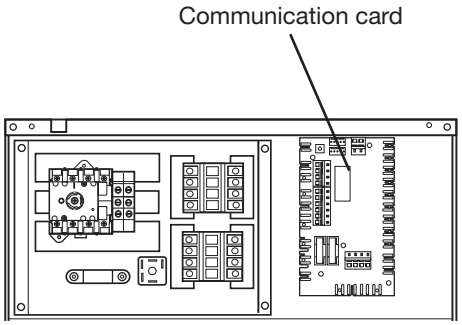
(8) This communication card contains:

(9)

- **Fuses F11 and F12 (1.25 A)**
  These protect the received voltage supply for the programme unit and door lock controller.
- **Output connection blocks**
  Control signals for connection to external system such as detergent supply.

Card No.	Function
Outputs (110-240V AC)	
X70	see Payment system
X71:1	0 V Door locked (common)
X71:2	L1 Door locked
X72:1	Common
X72:2	Liquid supply 1 (Pre wash)
X72:3	Liquid supply 2 (Main wash)
X72:4	Liquid supply 3 (Softener)
X72:5	Liquid supply 4 (Bleach)

8



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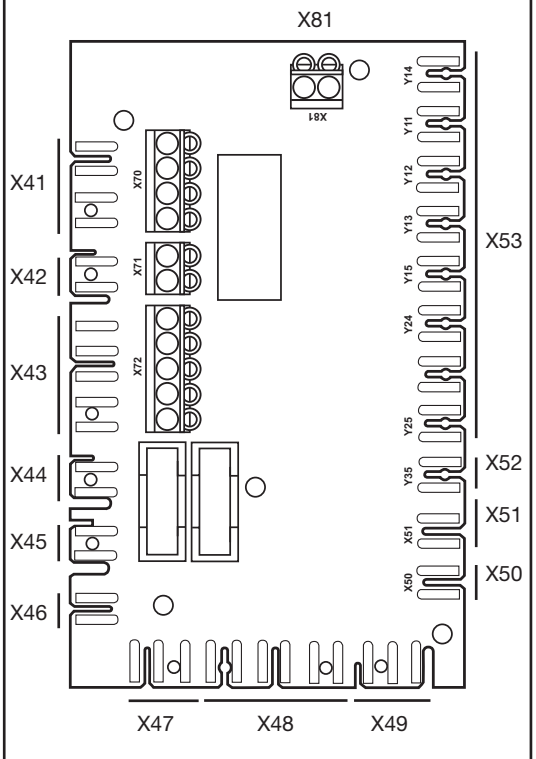

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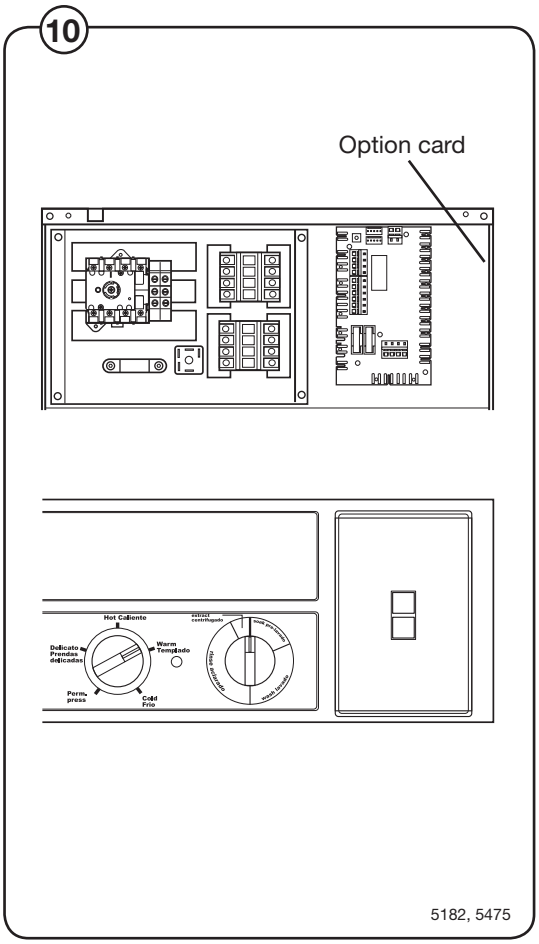
Option card

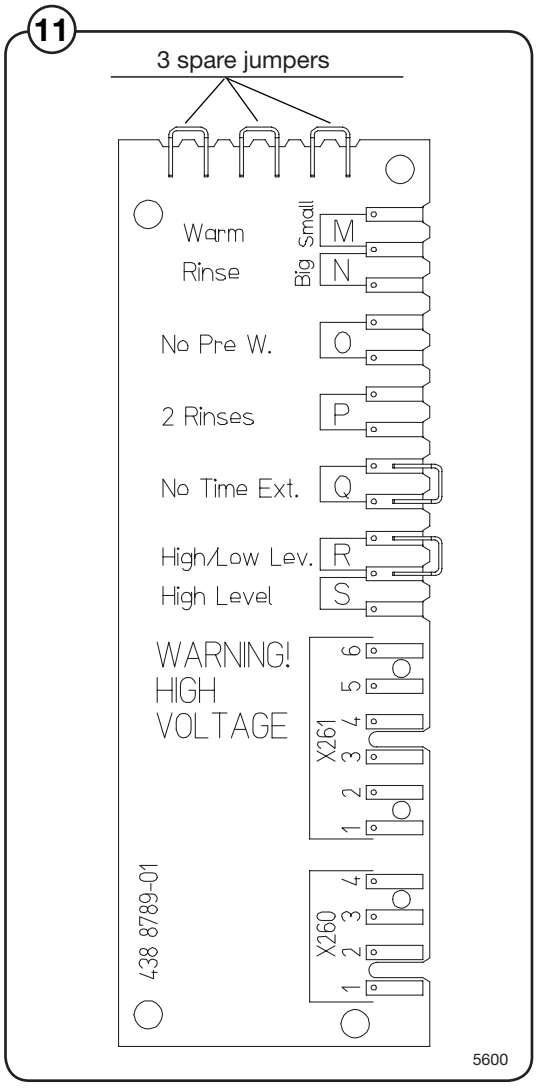
(10) The option card is only available on machines with programme OL03.

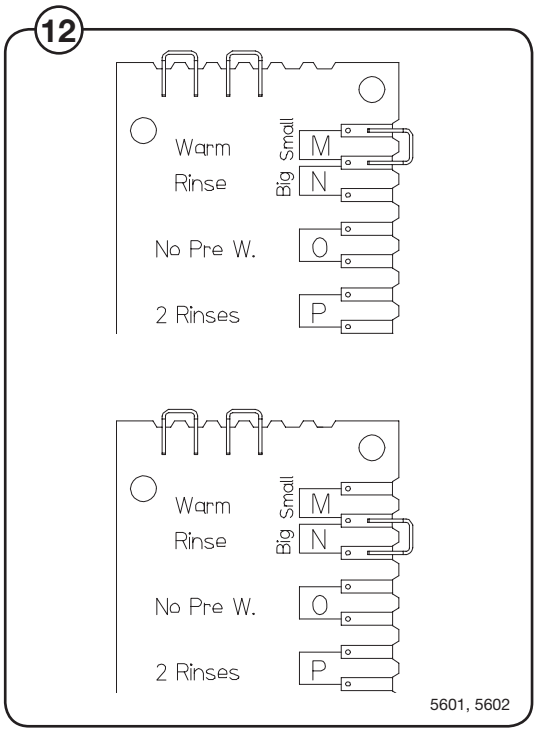


5182, 5475

(11) There are some possibilities to alter the standard parameters in the wash programs by moving or adding jumpers on the option card.

(12)
- When adding a jumper on N or M gives warm rinses instead of cold. M shall be used on W475N-W4130N and N on W4180N-W4330N.





(13) • When adding a jumper on O there will be no pre-wash in the programs.
The timer rapid advances the pre-wash automatically. Remember that "Delicate" is always without pre-wash.

(14) • When adding a jumper on P there will be two rinses instead of three. The timer rapid advances the first rinse.

(15) • If the jumper on Q is removed the main wash will be extended by three minutes to nine minutes instead of six.

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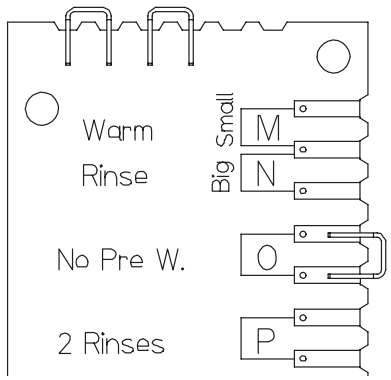

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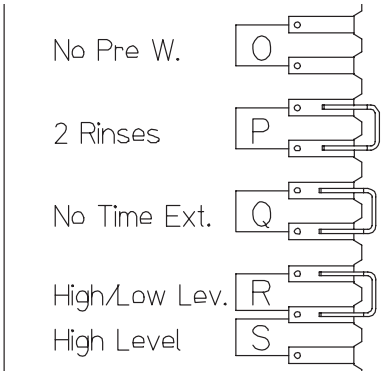

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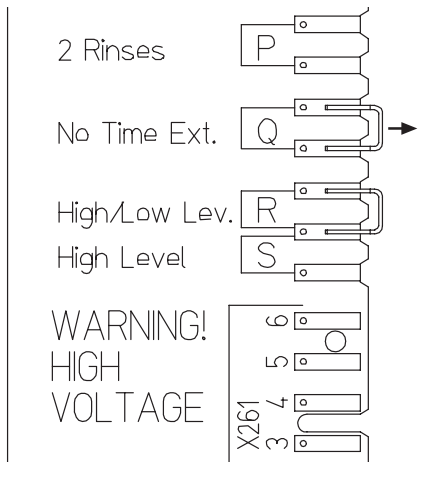

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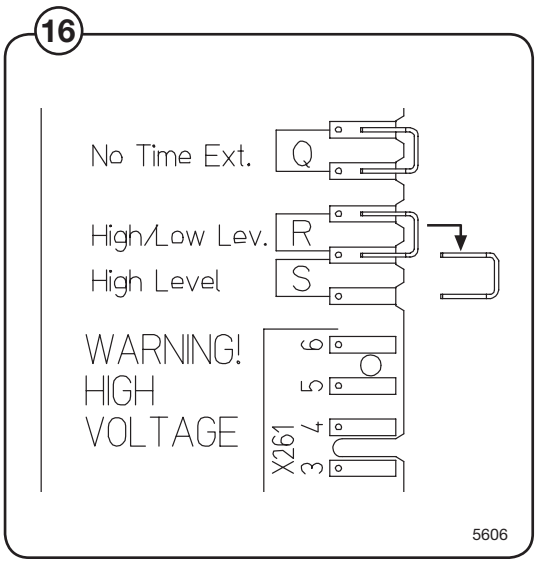
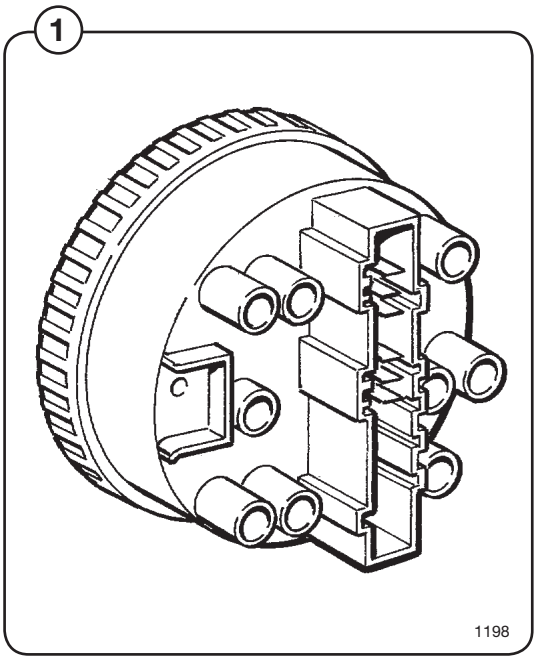
(16) • In standard position on R, low level is used in pre-wash, main wash and high level in rinses. If jumper is moved to S it will be high level also in pre-wash and mainwash.



Level control



(1) The level switch is a pressure sensor controlling two different drum water levels by sensing air pressure in a hose connected to the drum's bottom. When the water rises in the drum and hose, the air in the hose compresses and, at two preset pressure levels (shut-off levels), two different alternating contacts in the pressure sensor are activated.

(2) When the water drains from the drum, the contacts switch back to original position, but now at lower water levels than was required to activate the contacts when the drum was being filled. These levels are called minimum levels. If the water level during washing falls below the minimum level, water will be added until the shut-off level is again reached.

Control and fault tracing

All level sensors are factory-set for the various machines. As a rule, this setting should not be changed. For that reason, the level controls are sealed with enamel paint.

A faulty level switch can not be repaired and should be replaced.

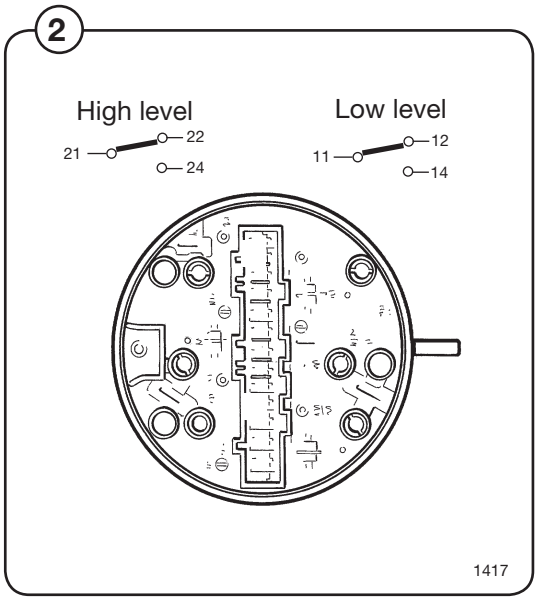
The machine guarantee ceases to be valid if the level sensor is tampered with.

Water level check

(2) Start the machine and select a standard program. Check low water level for prewash and main wash according to the illustration. Advance the program using the **START** button and check high water level for rinsing.

Water level is too high

- Check that the hose connecting the level switch and the drain valve is not obstructed. When necessary and when the machine is empty of water, clean the hose by disconnecting it from the level switch and blowing air through it.
- Check the hose for holes which can be caused by the hose rubbing against the pulley.
- Overfilling can also be caused by burnt contacts in the level switch. If this is the case, replace the level switch.



Thermostat

Data

Range off-on	approx. 4°C
Max. temperature for sensor	150°C
Sensor medium	Liquid

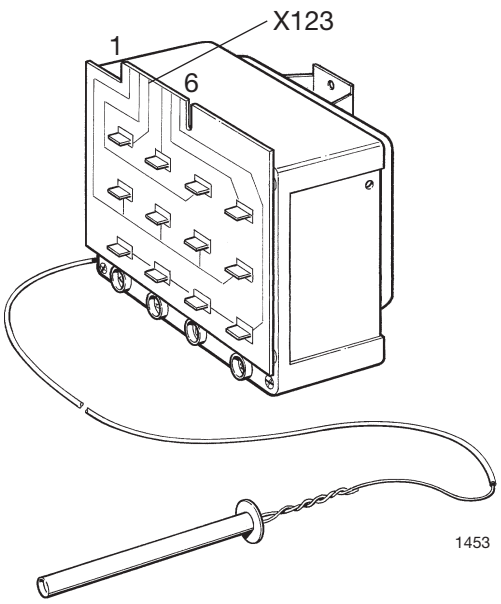
Description

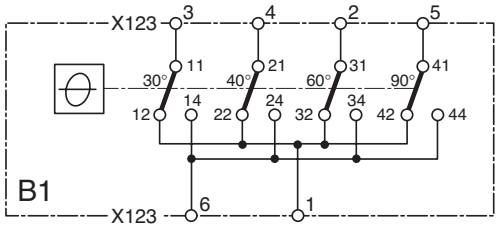
(1) The thermostat monitors the temperature while the machine carries out a program. The heating element contactor is controlled using open and closed contacts.

The thermostat sensor is located at the lowest point of the outer drum to the left of the heating element. A liquid-filled cable (capillary tube) runs from the sensor to the thermostat, located in the automatic control unit. The water temperature controls the liquid expansion and thereby the activation of the various thermostat contacts.

Temperature selection (contact selection) (90°C, 60°C, 40°C or 30°C) is controlled by the programmer and the program selector.

(1)





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Repair instructions

All thermostats are factory-set for the various machines. As a rule, this setting should not be changed. For that reason, the thermostats are sealed with enamel paint.

The machine guarantee ceases to be valid if the thermostat is tampered with.

Replacing the thermostat

- Remove the front panel and pull out the thermostat sensor.
- Undo the capillary tube strapping and replace the thermostat. Install the new capillary tube in the same way as the old one.

Door and door lock

General

The door locks consists of the following:

(1)

- **Door lock A111**, which contains
  - An **actuator** that locks the door lock and also has two built-in micro switches, S4a and S4b. The actuator is bi-stable, i.e., it has two stable positions: locked door and unlocked door. The actuator must receive a pulse to lock and unlock the door lock. S4a and S4b are both closed when the door is locked.
  - A **micro switch S3** that is closed when the door is closed.
  - An **emergency opening arm/emergency opening button** that can be used to open the door lock in an emergency.

(2)

- **Door lock controller A31** situated in the front control unit of the machine. This card controls the door lock function and supervises whether the drum is empty and not turning. It locks and unlocks the door lock when the programme unit requests door locking or unlocking.

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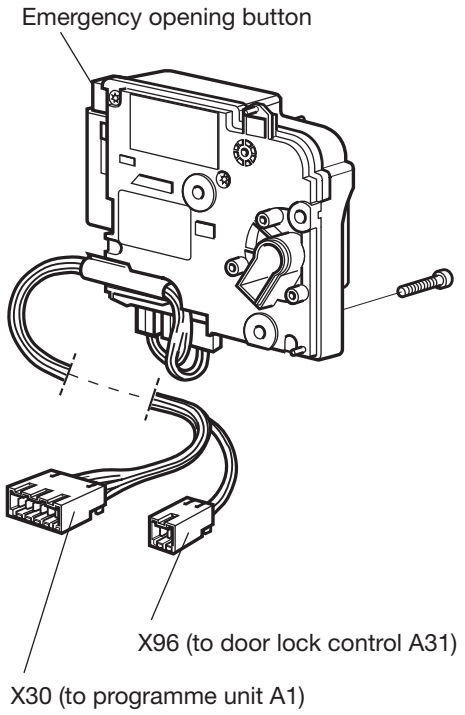

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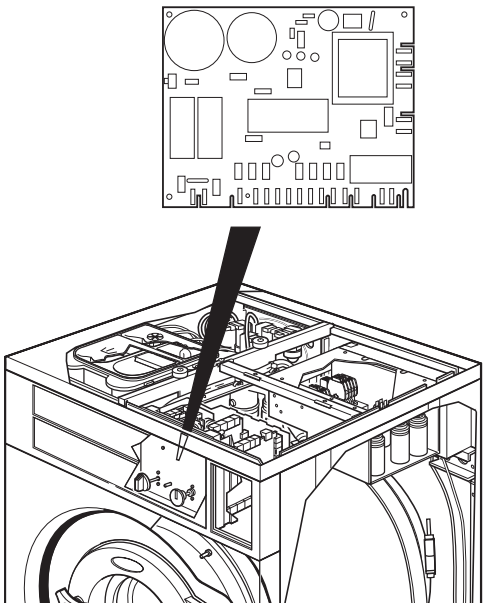

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The door lock locks the door

(3) When the door is closed (closed door lock switch S3), the programme unit may request door locking by applying a voltage of 110-240 V on the door lock controller A31 input X92.

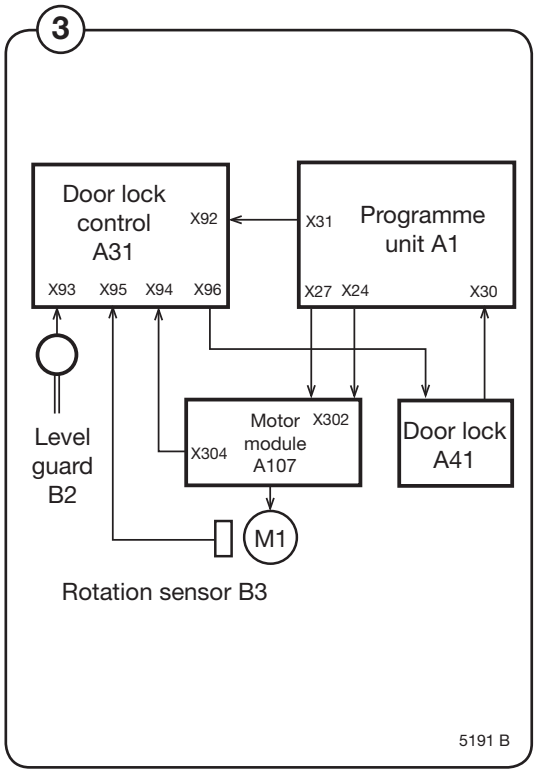
The following check is made by the A31 card prior to locking of the door:

- **No water in drum** - input X93 from level guard B2 is closed = 0 V
- **Motor not engaged** - input X94 from motor control A107 open = 5 V
- **Drum not turning** - no pulses on input X95 from rotation sensor B3.

When the above conditions are met, the card A31 outputs a closing pulse on output X96 to the door lock actuator/coil, which then locks the door. The micro switches S4a and S4b in the actuator/door lock are closed when the door is locked. These micro switches feed voltage to:

- **The output switches** on the programme unit. The switches control the machine's drain and water valves as well as heater switch-on.
- **Interlock signal** enables motor operation.

Programme operation is now possible.



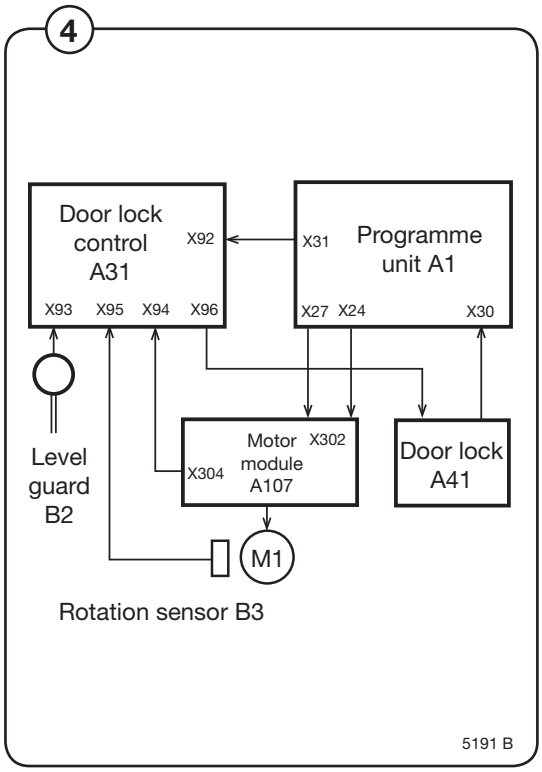
The door lock unlocks the door

④ The programme unit requests door unlocking by applying 0 V on input X92 of the door lock controller.

The following check is made prior to unlocking of the door:

- **No water in drum** - input X93 from level guard B2 is closed = 0 V
- **Motor not engaged** - input X94 from motor controller A107 open = 5 V
- **Drum not turning** - no pulses on input X95 from rotation sensor B3.

When the above conditions are met, the door lock controller outputs an opening pulse on output 96 to the door lock actuator/coil, which then unlocks the door. Micro switches S4a and S4b now interrupt the relays/switches. The drain, water valves, heater and motor cannot now be switched on.



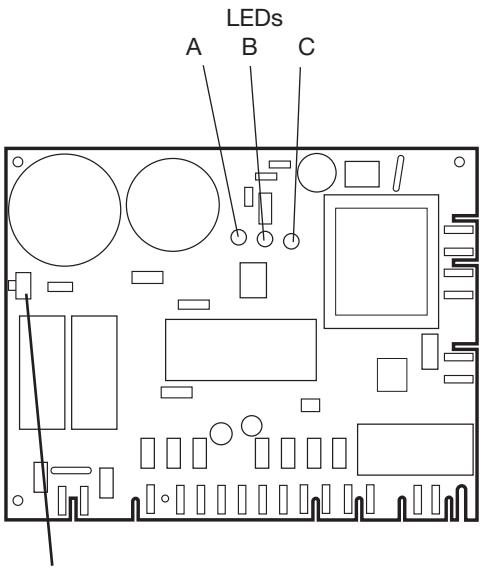
Error codes

(5) The door lock control has three LEDs that show whether the door lock operates normally or whether an error has been detected. During normal operation, the LEDs blink when the drum is not turning and are off when the drum rotates. In case of an error, the three LEDs will show the error condition according to the table below. If an error disappears, the error code condition disappears. If the error is still present at the programme end, the error is automatically cleared after 5 minutes and the door is unlocked.

LEDs A	LEDs B	LEDs C	Normal operation
●	●	●	No error. The drum is not turning (LEDs blinking)
❍	❍	❍	No error. The drum is rotating
LEDs A	**LEDs B**	**LEDs C**	**Error state**
●	●	❍	Level guard B2 indicates water in drum when the door lock is open (input X93 not closed).
❍	●	●	Motor control indicates that motor is operating when door lock is open (input X94 not open).
●	❍	❍	No signal from rotation sensor B3 (frequency input X95 < 0.4 Hz) in spite of the motor control indicating motor operation (input X94 open).
❍	●	❍	No signal from motor control (input X94 not open) in spite of rotation sensor B3 indicating motor operation (frequency input X95 > 0.4 Hz).
●	❍	●	Error in drive circuits for door lock (output X96) or error in door lock/cable harness for the door lock.
❍	❍	●	Internal error in the door lock control.

❍ = no lit, ● = lit

(5)



Reset button

(5) The door lock control features a reset button used to reset the programme routines stored in the computer. When pressed, any error codes are erased.

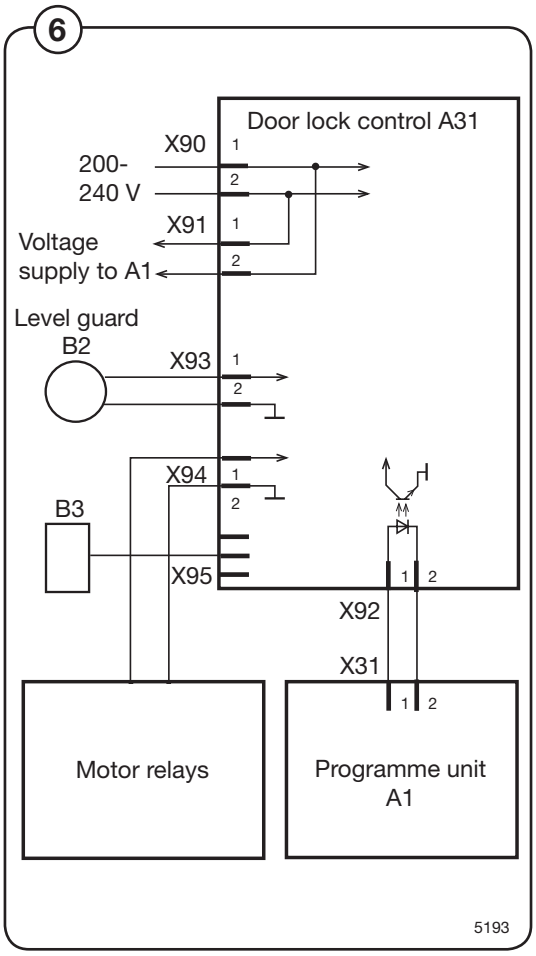
Door lock control inputs/outputs

(6) **X90: AC 110-240 V AC feed**

X91: Transfer of voltage supply
Feeds the voltage to programme unit A1.

X92: Input from programme unit: Lock door
Prior to the door lock control locking the door (output X96), a check is made for any water left in the drum (input X93 closed) and whether the drum is not rotating (input X94 open).

Input voltage X96	Function
110-240 V AC:	Programme unit requests door locking
0 V:	Programme unit requests door opening



(7) **X93: Input from level guard**

If the input indicates “Water in drum” when the door is not locked, the door cannot be locked. The LEDs then show the error code ● ● ❍.

Input voltage	Function X93
5 V DC:	Water in drum (level guard open)
0 V:	Drum empty (level guard closed)

X94: Input from motor control

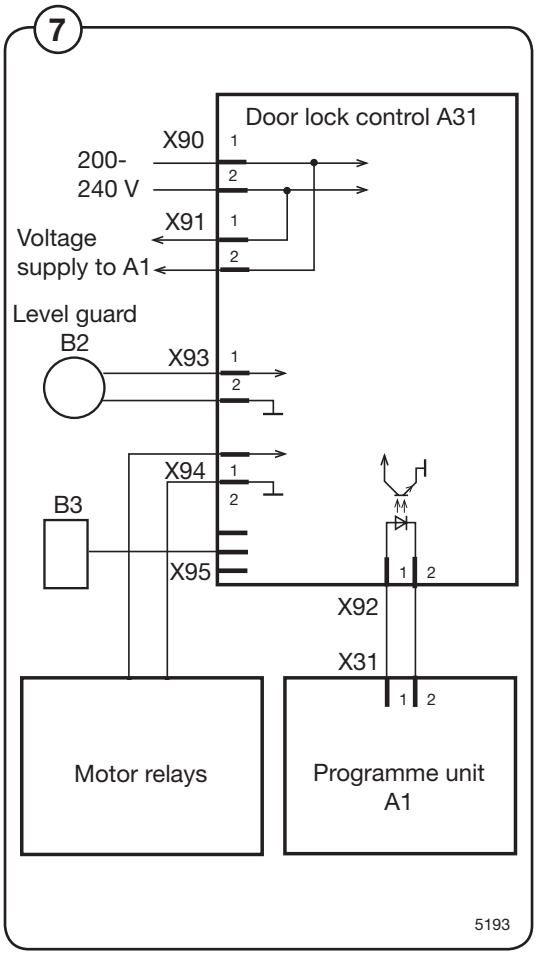
If the input indicates “Motor operating”, the door cannot be locked. The LEDs then show the error code ❍ ● ●.

The input signal from X94 is compared with the signal from the rotation sensor B3 (input X95).

If the motor signal is operating, but the rotation sensor does not provide a signal, the error code ● ❍ ❍ is shown.

If the rotation sensor indicates motor rotation when there is no motor signal, the error code ❍ ● ❍ is shown.

Input voltage	Function X94
5 V DC:	Motor not operating (input closed)
0 V:	Motor operating (input open)



(8) **X95: Input from rotation sensor on motor shaft**

(9) When the motor is operating, a pulse train is applied on the input.

Input	Function
Pin 1:	DC 4-10 V feed
Pin 2:	0V
Pin 3:	DC 5 V pulse input

X96: Output to door lock

Locks the door lock when the following conditions are met:

- DC 110-240 V AC on input X92 (programme unit requests door locking).
- DC 0 V on input X93 (no water in drum).
- DC +5 V on input X94 (motor not operating).
- No pulses on input X95 (drum not rotating).
- No error code present.

Unlocks the door lock when the following conditions are met:

- DC 0 V on input X92 (programme unit requests door unlocking).
- DC 0 V on input X93 (no water in drum).
- DC +5 V on input X94 (motor not activated).
- No pulses on input X95 (drum not rotating).
- No error code present.

Voltage	Function
17 - 31 V DC, + on pin 1, - on pin 2	Unlocks the door
17 - 31 V DC - on pin 1, + on pin 2	Locks the door

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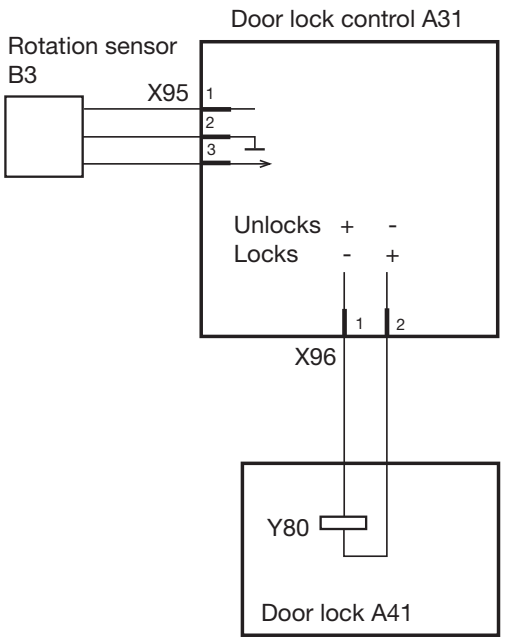

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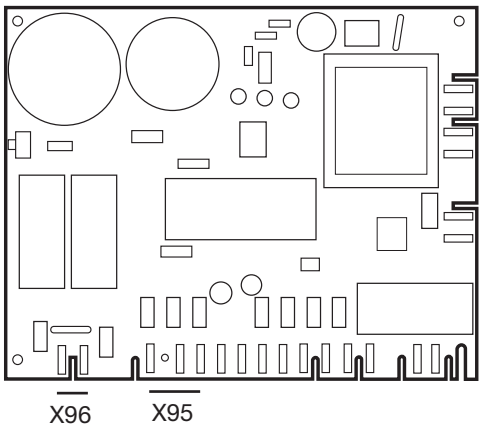

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Repairs

Repair work on the machine should only be done by specially trained personnel.

Emergency opening of door lock

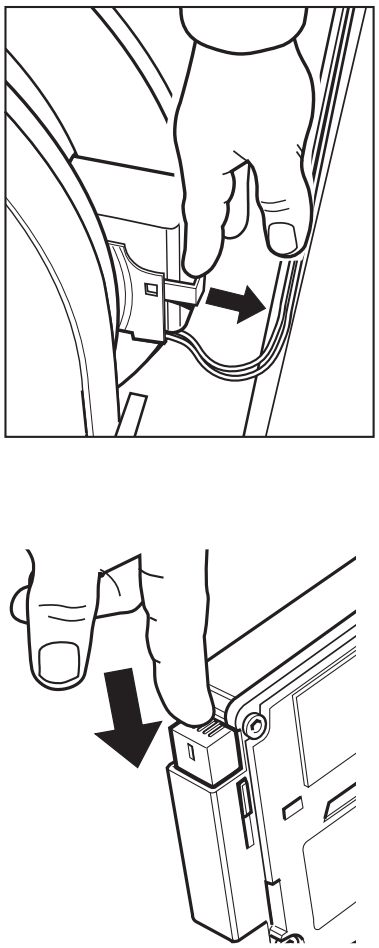
(10) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the front cover or top cover. When replacing the door lock, it is recommended to remove the front cover.

3. Pull the emergency opening arm to the side. This retracts the spring-loaded locking pin and the door lock opens.
   Alt. Press down the emergency opening button.

4. Reset the emergency opening correctly.

(10)



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Replacing the door lock

1. Take down power from the machine by turning the main power switch to the 0 position.
2. Remove the front cover alt. side pole.
3. Remove the door (two screws in each hinge).
4. Remove the front panel.
5. Remove the door lock (three holding screws).
6. Verify the strap positions on the cable for the lock. Cut the necessary straps to undo the cables leading to the lock.
7. Undo the connectors.
8. Replace the door lock.
9. Reconnect the new (door) lock.
10. Assemble in reverse order.
11. Strap the cables for the lock according to the notes made in step 6.

Motor

DANGER

Be careful when measuring capacitors and filter.

Description

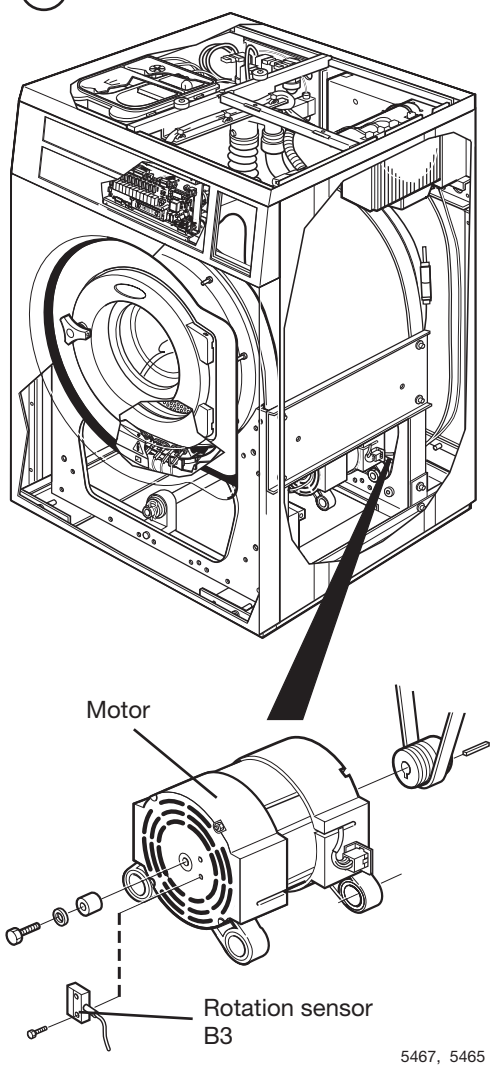
(1) The motor is fitted in a bridge carrier under the outer drum. It drives the washing drum using a drive belt.

The motor is controlled by contactors.

The motor winding is protected against overloads using a thermal overheating protector that is automatically reset.

The motor is connected directly to the motor module via a cable with quick connectors.

1



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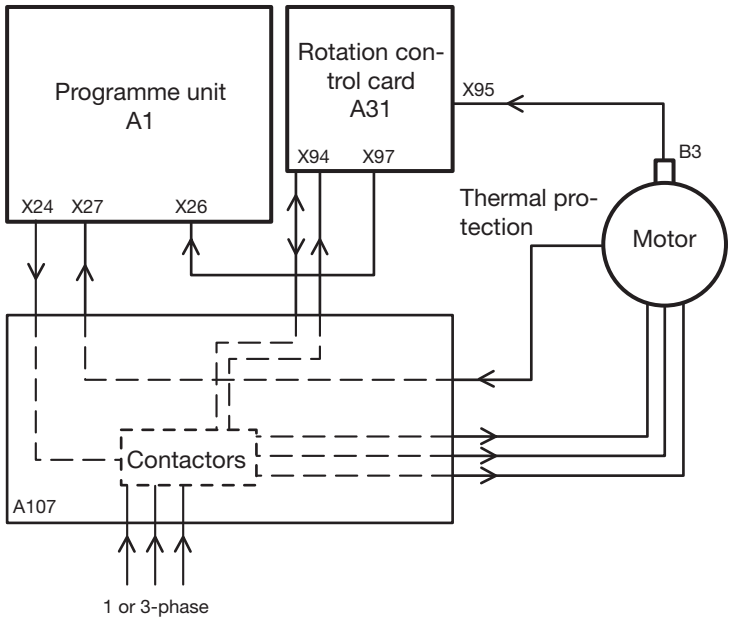
2



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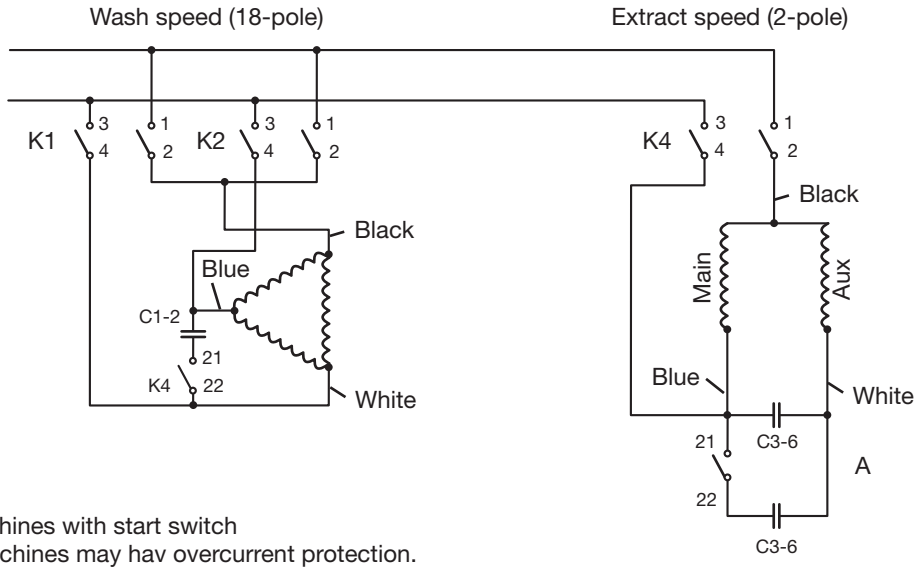
Principle wiring

3

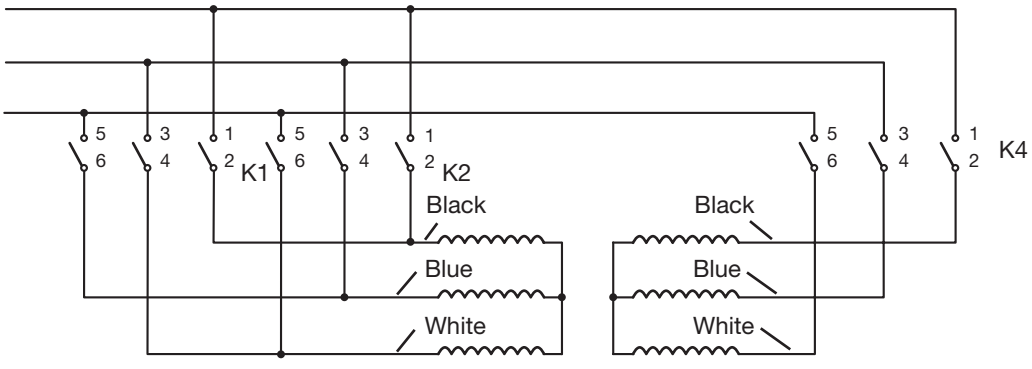
Single phase



A Only machines with start switch
Note! Some machines may hav overcurrent protection.
This is not shown here.

5973

Three phase



5974

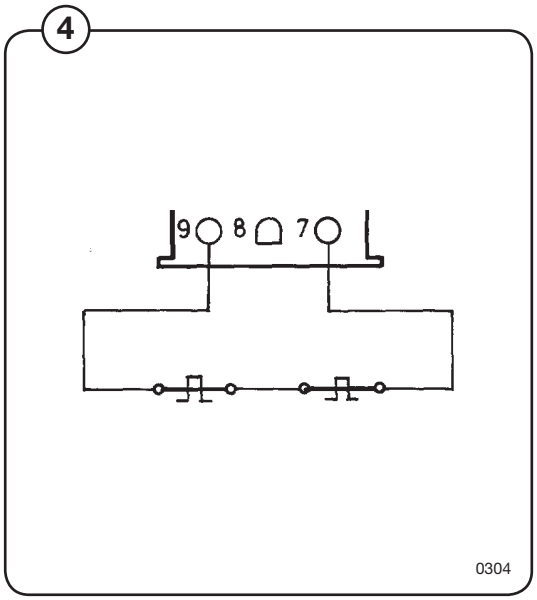
Note! Some motors are possible to change from Y to D-connection to accomodate different voltages.

Motor overload protector

(4) The motor is equipped with one or more thermal overload protectors. The protectors are connected in series and will trip at a temperature of 150 ± 5°C.

A burned out motor can be re-wound.

Some single-phase machines are also equipped with a manual resettable overload protector mounted on the extract relay in the motor module. This overload protector protects the motor during the start-up of the extraction.



Repairs

Repair work on the machine should only be done by specially trained personnel.

Motor replacement

Disassembly

(5) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the rear cover.

3. Undo the bracket for the drain hose connector from the lower rear piece, then remove the rear cover.

(6) 4. Undo the ground connection from the motor.

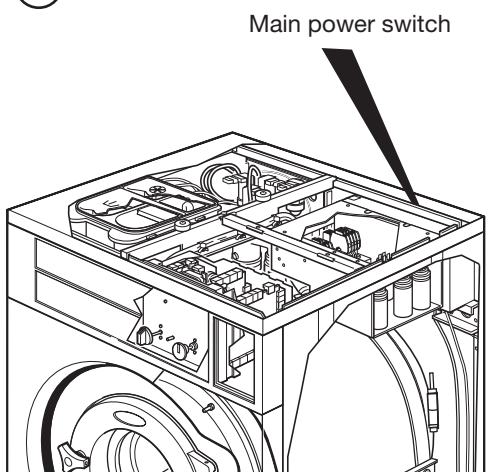
5. Remove the drive belt by pulling the belt towards you while rotating the drum by hand.

6. Undo the motor cable from motor.

7. Undo and remove the motor mounting bolts.

8. Lift out the motor.

5



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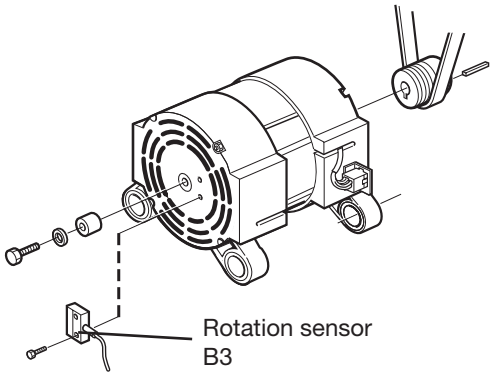


5465

Assembly

1. Fit the new motor **without** locking the mounting bolts.
2. Fit the drive belt and adjust the belt tension with the tensioner on one side of the motor. Se section Adjustments - Drive belt tension for details.
3. Connect the new motor to the cable and use straps to secure the cable.
4. Connect the motor cable to the motor.
5. Fit the lower rear piece and secure the drain hose connection with screws.
6. Fit the upper rear piece.
7. Connect the voltage supply and verify that the motor operates normally.

Adjustments

Drive belt tension

The drive belt is pre-tensioned upon delivery from the factory.

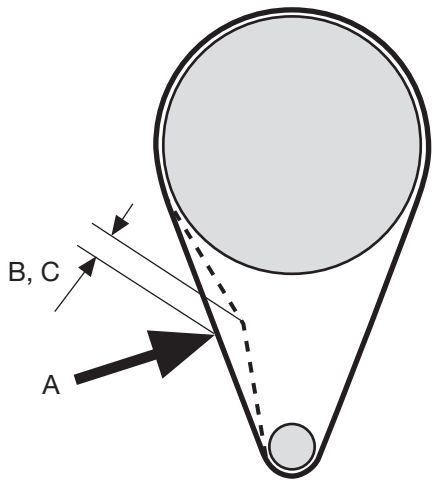
(7) The drive belt tension should be as follows:

Model	Force A (N)	Post tensioning B (mm)	New belt C (mm)
W475N	35	8	6
W485N	35	9	8
W4105N	40	8	7
W4130N	40	8	7
W4180N	60	9	7
W4250N	68	8	7
W4330N	45	8	6

(8) To adjust drive belt tension, first undo the motor retaining screw a couple of turns, then press down on the motor to achieve proper tensioning. Lock the locking nut when the tension is correct. Then lock the retaining screw.

Inspection of the drive belt tension is an important part of general maintenance.

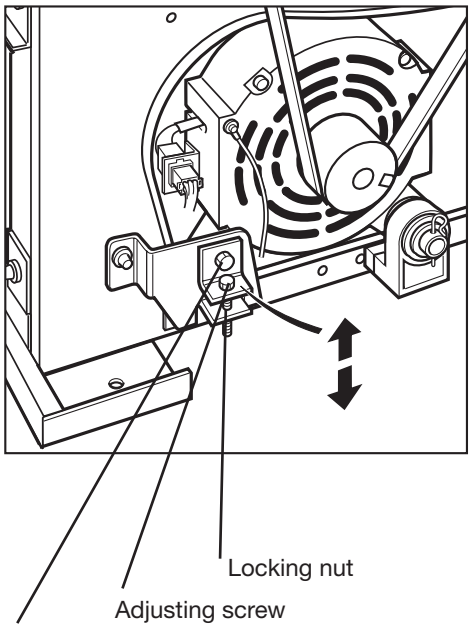
(7)



Adjust drive belt tension if values exceed those shown in the table.

5194

(8)



5184

Drain valve

(1) The drain valve is situated on a flange at the bottom of the outer drum and can be accessed from the front after removing the front cover.
The drain valve consists of the following principal parts:

- Lower part with rubber diaphragm.
- Piston and cylinder.
- Pressure plate and recoil springs.
- Rubber diaphragm with drain connection.
- Upper part with connection for outer drum.

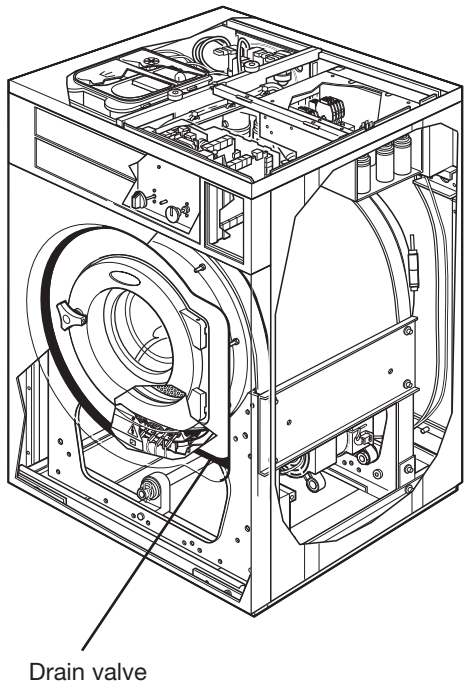
Function

(2) The drain valve uses the water pressure in the cold-water inlet to close the valve. A feed hose is connected between the water inlet and the control valve.

When the control valve operates (drain valve should be closed), the control valve opens the water pressure onto the feed hose, which is connected to the lower part of the drain valve. When the lower part is filled with water, the lower part diaphragm pushes up the piston. The piston lifts the pressure plate against the drain valve rubber diaphragm, which in turn forms a seal against the outer drum, effectively closing the valve.

When the drain valve should be opened, the control valve changes position to allow the water pressure to the lower part of the drain valve to close, instead opening the return hose to the drain. The pressure plate recoil springs pull the pressure plate back, upon which the piston is pressed back into the cylinder. The water from the lower part is fed through the feed hose and the control valve to the drain.

7



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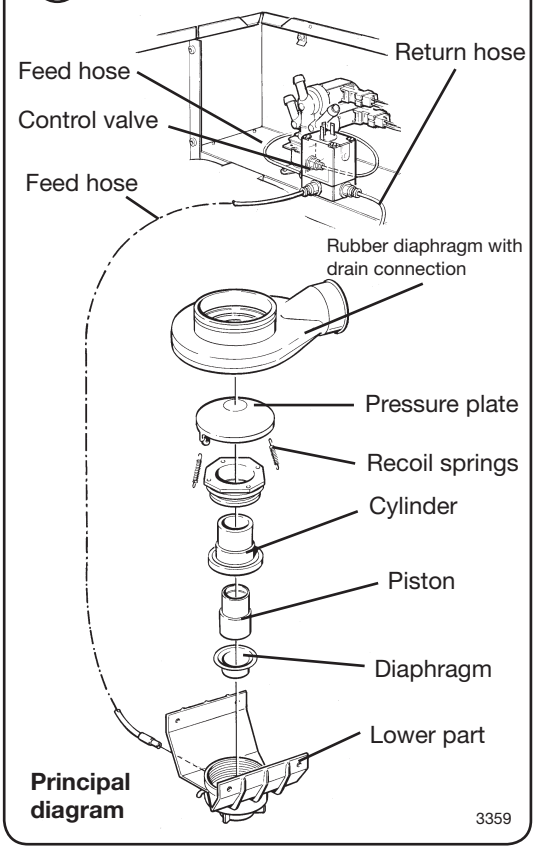


Principal diagram

3359

Drain valve

Repairs

Repair work on the machine should only be done by specially trained personnel.

Disassembly

For repair works on the drain valve, there is a risk that water still left in the machine may flood onto the floor. Be sure to dry up any spilled water since it may cause people to slip and hurt themselves.

(3) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the front cover.

(4) 3. Disconnect the drain hose from upper part of the valve.

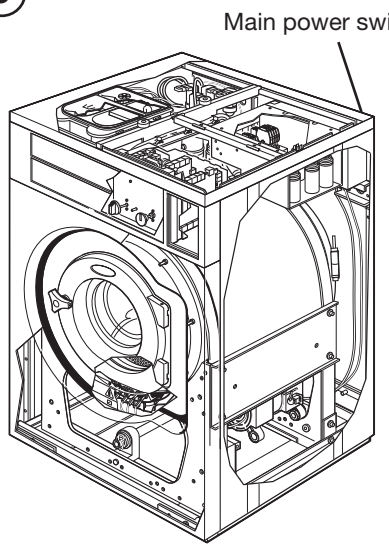
4. Undo the hose clamp holding the valve rubber bellows against the sleeve coupling of the outer drum.

(5) 5. Loosen and unscrew the 4 retaining nuts of the valve a couple of turns (use a socket, extender and ratchet wrench). Turn the valve and unhook it from the bolts.

6. Disconnect the pressure hose from the lower part of the valve.

7. Replace the valve with a new one or replace the defective part.

3



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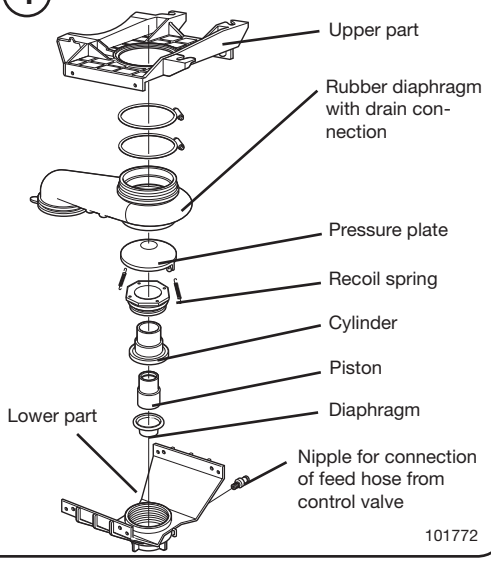

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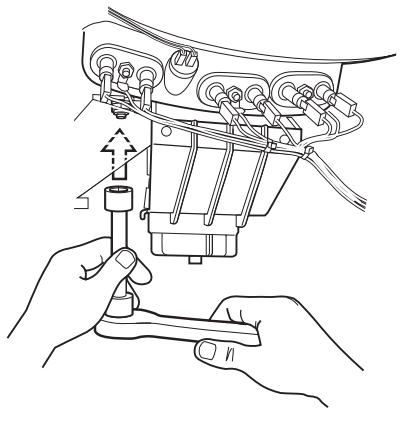


Assembling

(4) 1. Connect the pressure hose to the lower part of the valve. Verify that the hose is not bent or pinched.

2. Fit the rubber bellows onto the sleeve coupling.

(5) 3. Hook the valve onto the bolts and turn the valve into position. Secure the 4 retaining bolts of the valve.

4. Secure the hose clamp at the connection of the rubber bellows on the sleeve coupling.

5. Connect the drain hose to the upper part of the valve.

(3) 6. Turn the main power switch to position 1 and verify correct valve operation and that it does not leak.

7. Reattach the front cover.

Detergent compartment

(1) The detergent compartment of the machine is designed for use with powder and liquid detergent. The compartment is divided into four sub-compartments as follows:

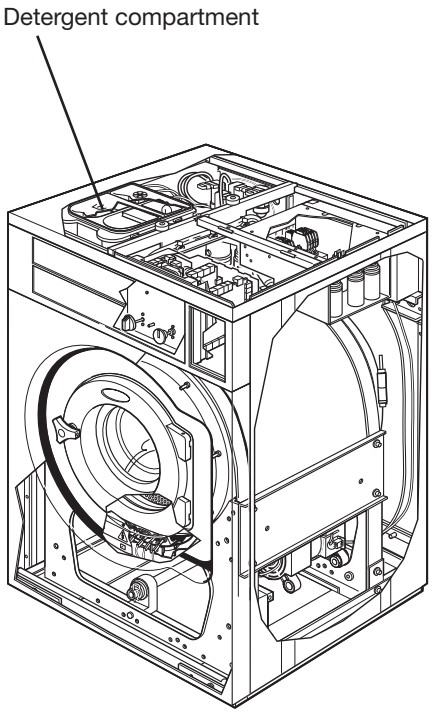
(2)
- Compartment 1 – For pre-wash with powder or liquid detergent.
- Compartment 2 – For main wash with detergent powder.
- Compartment 3 – Rinse.
- Compartment 4 – Main wash with liquid detergent or, bleaching-agent.

The connections for incoming water are situated on the rear side of the compartment. Compartments 3 and 4 each have one connector, while compartments 1 and 2 each have two connectors, one for cold water, the other for warm water.

The detergent is routed from the bottom of the compartment to the outer drum through the combo module immediately behind the compartment.

To safeguard against overfilling, e.g., due to a blocked hose on its way to the drum, the combo module features an overflow drain directly connected to the drain of the machine.

1



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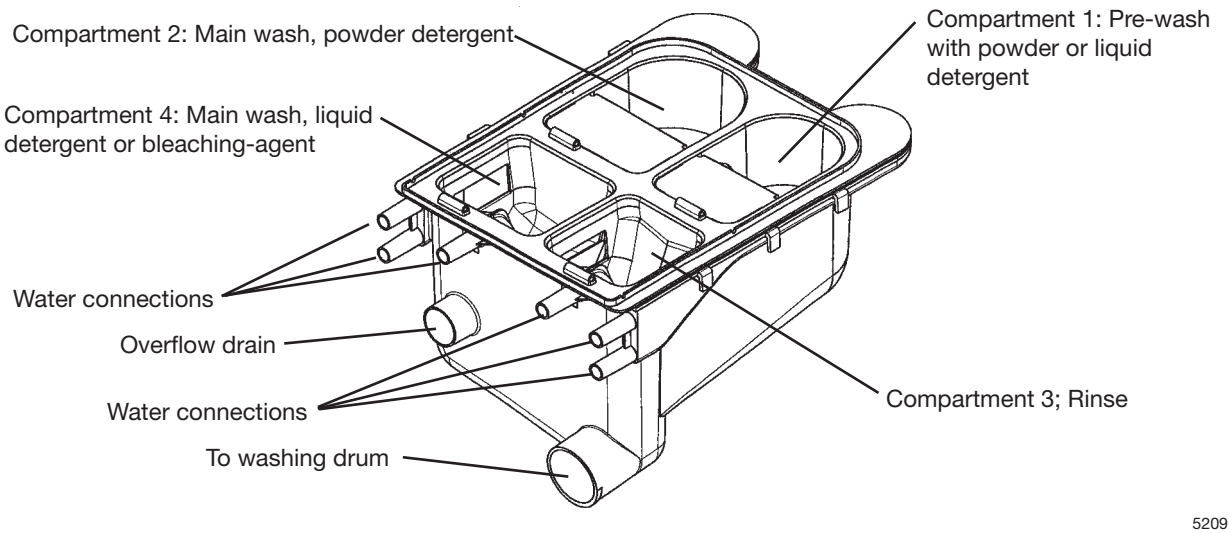
2


Compartment 2: Main wash, powder detergent
Compartment 1: Pre-wash with powder or liquid detergent
Compartment 4: Main wash, liquid detergent or bleaching-agent
Water connections
Overflow drain
Water connections
To washing drum
Compartment 3; Rinse

5209

Heating

Description

(1) The heating system of the machine consists of:

- Three heating elements for heating the water in the drum.
- A temperature sensor to detect the water temperature in the drum.
- One or two heating contactors for switch-on/ switch-off of the heating elements.

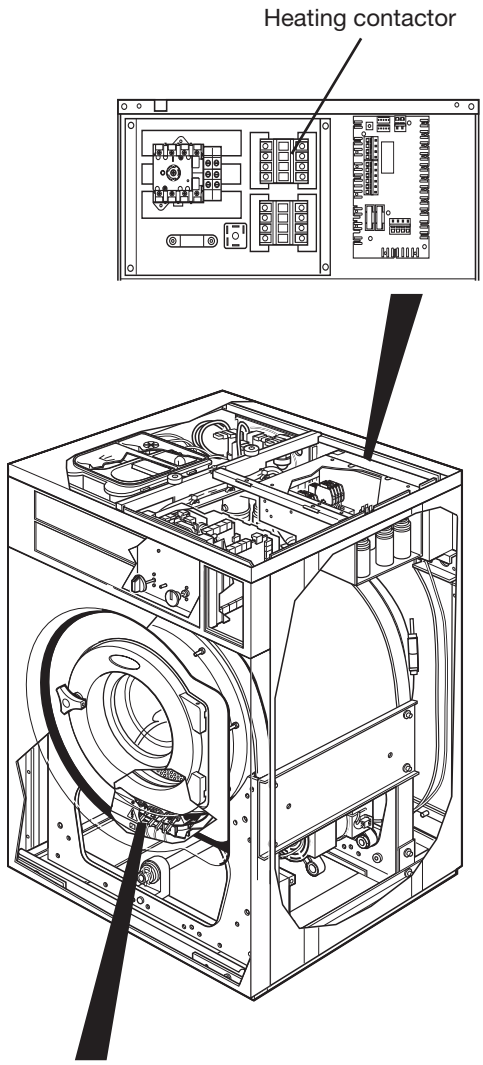
The heating elements and the temperature sensor are situated at the bottom of the outer drum close to the edge. They can be accessed front the front after the front plate is removed.

The contactor(s) is(are) placed in the rear control unit.

Depending on the size of the machine, the following heating elements are available:

Machine model	Heating element size (kW)
W475N	3x0.665, 3x1, 3x1.8, 3x2.5
W485N	3x0.665, 3x1, 3x1.8, 3x2.5
W4105N	3 x 3.3
W4130N	3 x 3.3
W4180N	3 x 4.33
W4250N	3 x 6
W4330N	3 X 7.66

(1)



Heating elements and temperature sensor

5182, 5916

Electric heating

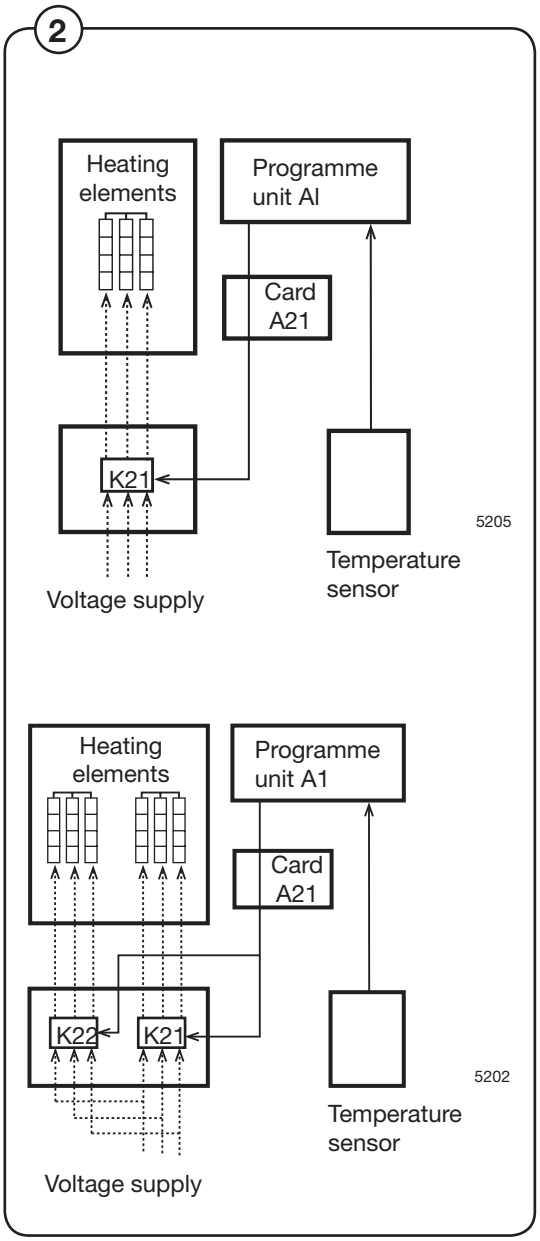
(2) The three heating elements in the machine are connected to separate phases and are switched on and off using one or two heating contactors, K.21 and K22 (two contactors are used for higher heating power). The heating contactors are controlled by the programme unit and thermostat B1.

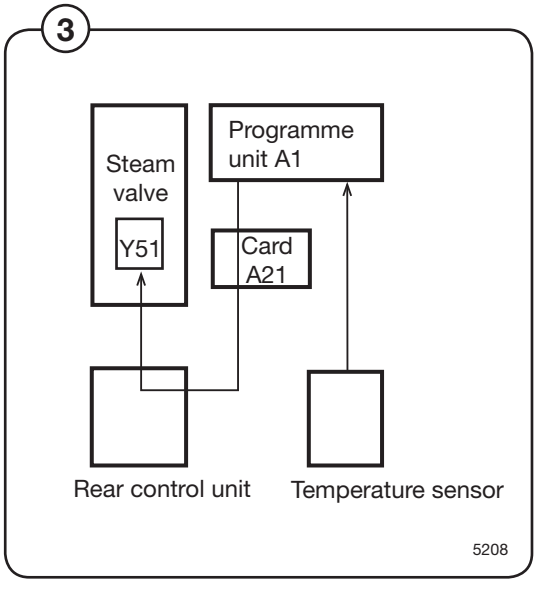
The programme unit receives information on the water temperature in the machine from the thermostat situated in the outer drum. The programme unit controls the heating contactors to achieve the set water temperature for the current washing programme.

When there is no water in the drum, the programme unit prevents switch-on of the heating elements. If an error would nevertheless cause the elements to switch on, a slow-blow fuse triggers to switch them off again.Then the heating element has to be changed.

Steam heating

(3) The steam valve is controlled by the programme unit A1. The control signal goes via the communication card A21.





Repairs

Repair work on the machine should only be done by specially trained personnel.

Replacing the heating elements

Wen replacing the heating elements, there is a risk that water still left in the machine may flood onto the floor. Be sure to dry up any spilled water since it may cause people to slip and hurt themselves.

(4) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the front cover.

(5) 3. Make a note of how the heating elements are connected.

4. Disconnect the connection to the heating element to be replaced.

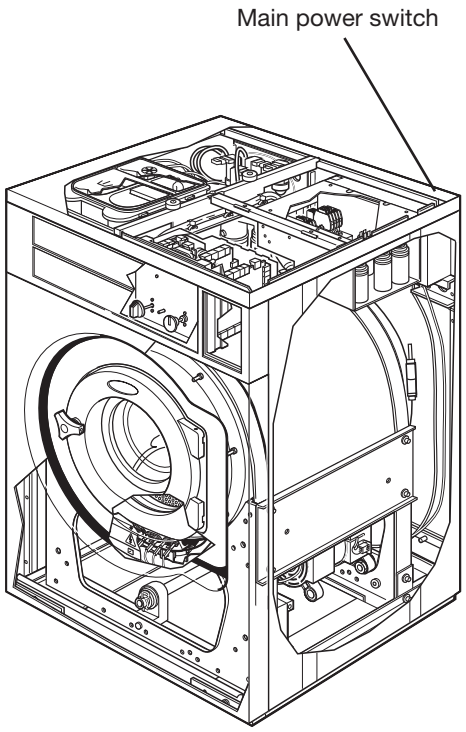
5. Unscrew the nut between the connections approx. 1 cm.

6. Push on the nut and bolt to undo the expansion bracket from the outer drum.

7. Remove the old heating element and install the new one. Be sure that the rear edge is fitted into the element holder at the rear of the outer drum.

8. Assemble in reverse order.

4



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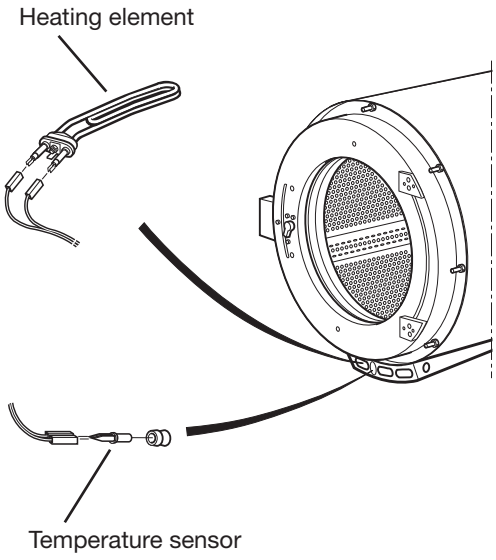
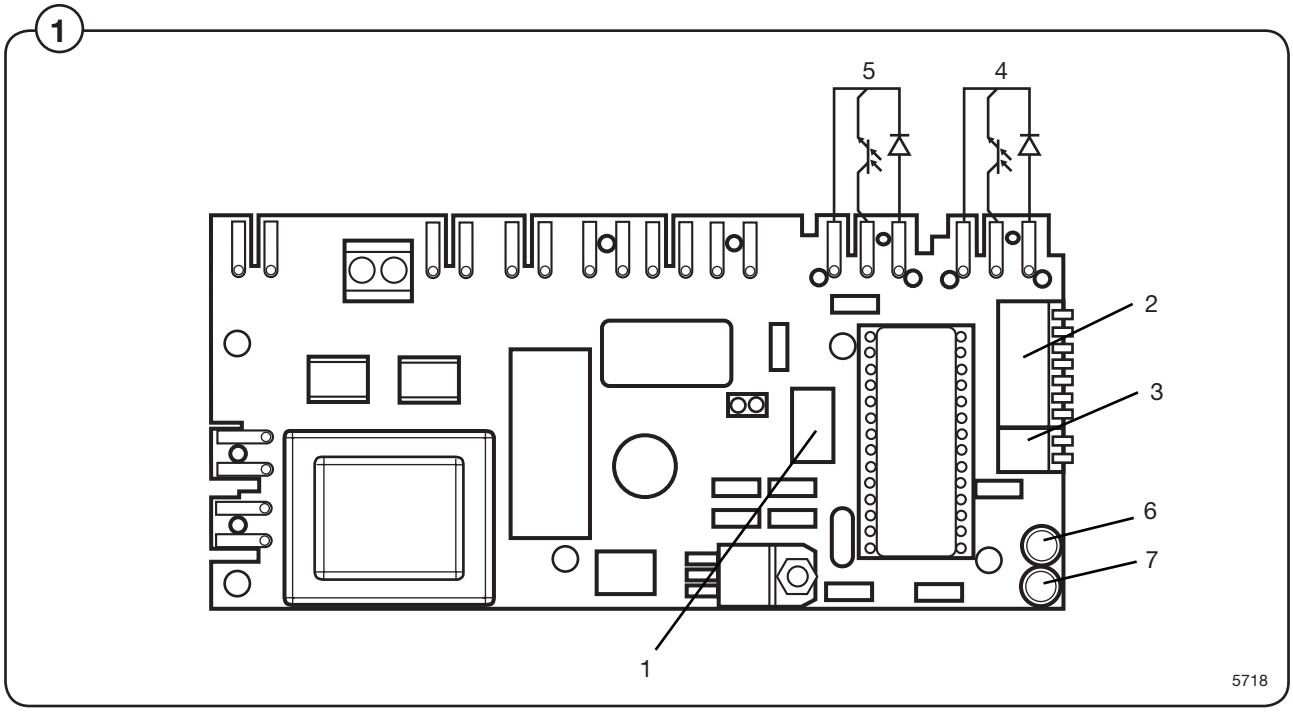


5204

Coin-meter

Setting wash price

- Pull out the coin box.
- From inside of the coin meter casette the different settings can be reached.



(1)

1. is the switch S1 for setting the ratio between coin 1 and 2 if the coin meter has two slots. If only one coin, all switches shall be set in OFF position.
2. is the switch S2 for setting the price.
3. is the switch S3 for price reduction.
4. is coin one, input for coin sensor one.
5. is coin two, input for coin sensor two.
6. Yellow LED flashes with frequency 3 Hz, the value left to insert and indicates accepted coin, lit 1 second.
7. Green LED flashes, relation coin 1 and coin 2. Continously lit when start relay is activated.

(2) Switch S1 is used for setting the ratio between the two coins. If the coin meter only have slot for one coin, all switches shall be placed in OFF position.

The following combination is available (ON = 1).

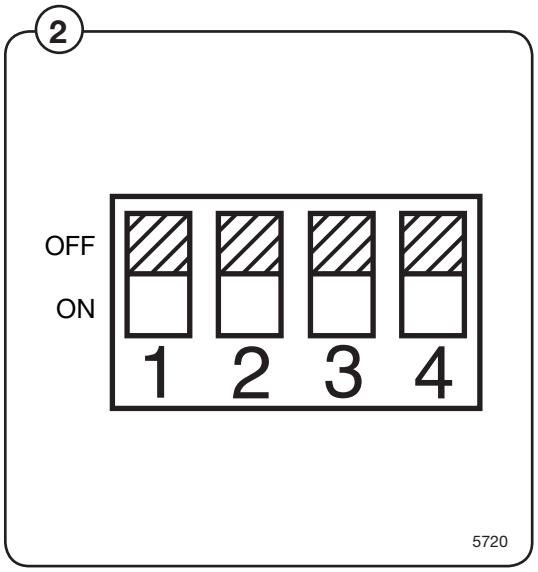
Switch	1	2	3	4	Ratio
	0	0	0	0	1:1
	1	0	0	0	1:2
	0	1	0	0	1:4
	1	1	0	0	1:5
	0	0	1	0	1:10
	1	0	1	0	1:20
	0	1	1	0	2:5

Example

Ratio 1:2 Value 2 is twice the value of 1.

Ratio 1:4 Value 4 is four times the value of 1.

Ratio 2:5 Value 5 is two and half times the value of 2.



Programming the current price

Programming is carried out on the switch unit, where the switches correspond to values from 1 to 64 when they are set on position ON.

First calculate the value I which the switches will give together and then set the switches so that they will give this number.

I = (P x A)/V where

P = price per program,

A = first number in coin ratio. When counter unit is for single coin insertion A is always 1.

V = value of coin. When counter unit is for double slot, the lower value.

(3) **Ex. 1**

P = 2 EURO 50 cent
Ratio 1:2 (1 EURO and 50 cent coins)

A = 1

V = 50

I = (250 x 1)/50 = 5
The switch should be set to 5 which can be achieved by setting switches 1 and 3 in position ON (1 + 4 = 5).

(4) **Ex. 2**

P = 1 EURO 50 cent
Ratio 2:5 (10 cent and 25 cent coins)

A = 2

V = 10

I = (150 x 2)/10 = 30
The switch should be set to 30 which can be achieved by setting switches 2, 3, 4 and 5 in position ON (2 + 4 + 8 + 16 = 30).

(5) **Ex. 3**

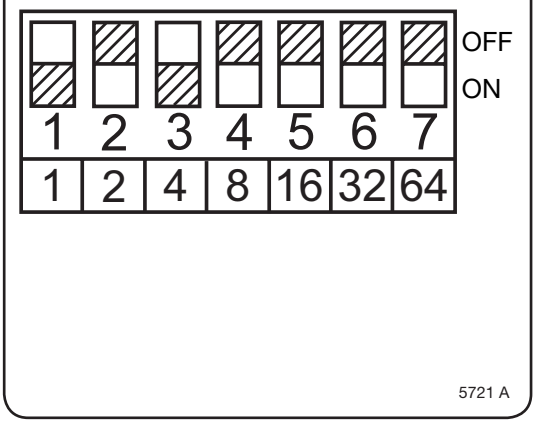
P = 90 pence
Ratio 2:5 (20 and 50 pence)

A = 2

V = 20

I = (90 x 2)/20 = 9
The switches should be set to 9 which can be achieved by setting switches 1 and 4 in position ON (1 + 8 = 9).

(3)



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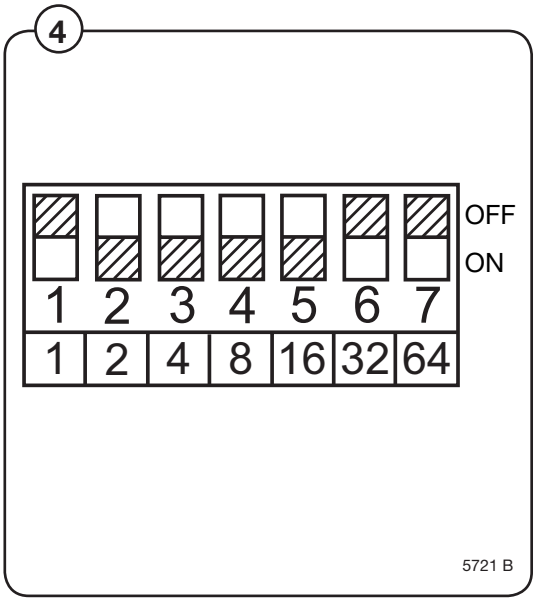

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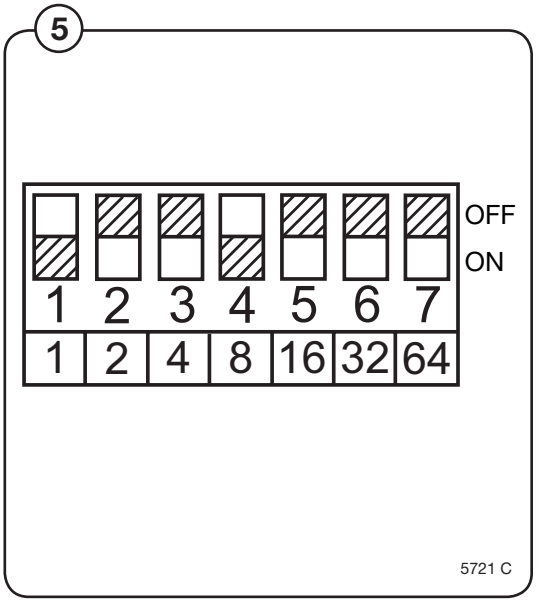
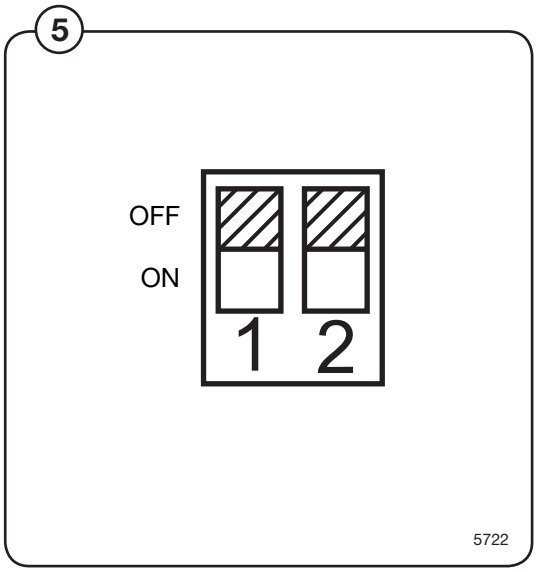


Price reduction

If one want to have price reduction for a certain day, etc switch S3 can be used.

(5) The following combinations are possible (ON = 1).

Switch 1	2	Reduction
0	0	0%
1	0	25%
0	1	50%
1	1	75%



Regular maintenance

To maintain correct and proper functioning and to prevent interruption of service, the following maintenance scheme should be adhered to.

The maintenance interval should be adapted to how frequently the machine is used.

Daily

- Check the door and door lock:
  - Let the door remain open and try starting the machine. The machine should not start.
  - Close the door, start the machine and try opening the door. It should not be possible to open the door until the drum has stopped turning.
  - Check that the door does not leak.
  - Clean the door seal, removing any detergent and fluff.
- Check that the drain valve does not leak during the wash cycle.
- Clean out any detergent remaining in the detergent compartment. Rapid advance through a program and let the water rinse the compartment:

Every third month

May only be carried out by authorized personnel.

- Check that the door does not leak.
- Check the drain valve and remove any fluff.
- Inspect the interior of the machine (during an actual wash cycle to ensure that no leaks are noticed) by:
  - Turning of the main power switch of the machine.
  - Remove the top cover and the protective front and rear plates.

- Verify that all internal hoses do not leak.
- Inspect the drive belt. Adjust the tension or replace if necessary.
- Check that water does not leak onto the floor.
- If the heating time is unusually long, check the heating elements. If the water is very hard, check whether there are lime deposits on the heating elements. Decalcify the elements if necessary. Adapt the amount of deliming agent to the manufacturer’s guidelines.
- Never switch on the heating elements when there is no water in the machine. This will cause the slow-blow fuse to trigger.
- Inspect the shock absorbers and coil springs.

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